FLIGHT
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THE AIRCRAFT ENGINEER

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DECEMBER 31st, 1942

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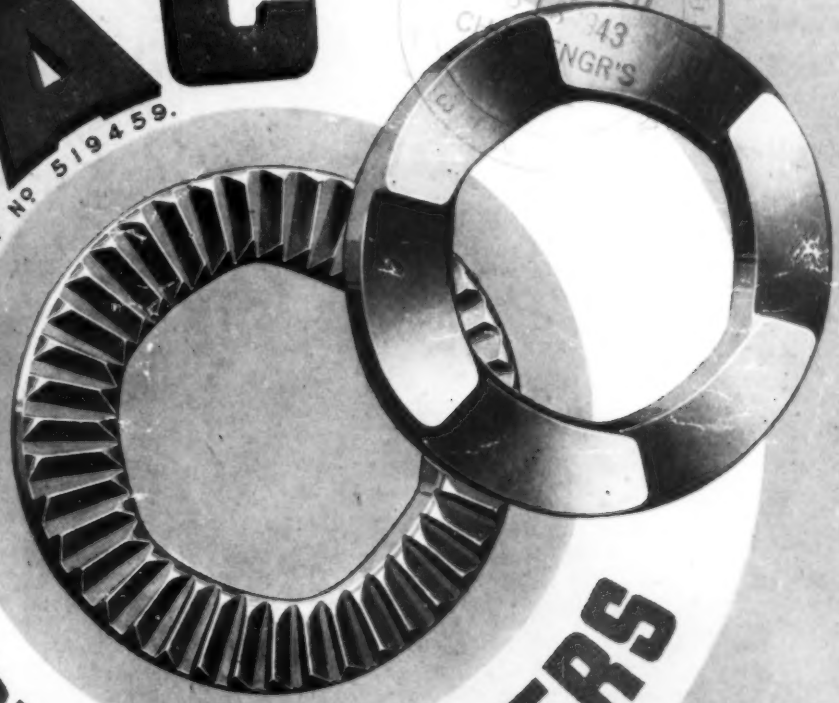

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FLIGHT
and
The AIRCRAFT ENGINEER

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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The Outlook

Air Transport

DURING the recent debate on civil aviation in the House of Commons, to which we could refer but briefly in last week's issue, Sir Lindsay Everard delivered an epigram which might well be adopted as a *leitmotif* in all our future considerations of post-war commercial aviation: "It is no good trying to run a first-class Empire with third-class aviation in the future; otherwise we shall court disaster, and we shall deserve it." If that fundamental principle be our guide, ways and means of giving it effect will be found. The debate showed unanimity in that desire.

On the subject of the broad policy to be adopted, speakers in the debate were obviously hampered by the fact that no one can foresee what Europe will look like at the end of the war, but there appeared to be a general tendency towards assuming that an "open sky" policy will best serve the needs of the world and enable commercial aviation to give the greatest benefits to the greatest number of people. Just how that is to be achieved did not emerge. Captain Balfour, in his reply, assured the House that "We are determined to have our place in the air transport system of the world for the British Commonwealth of Nations to link up its own interests with those of the other nations of the world."

The Joint Under-Secretary of State for Air drew a picture of two post-war alternatives which the Government were determined to avoid: closing-down a large part of the aircraft industry, or continuing to build bombers and fighters for which there would be little use. As a part of the larger general problem of post-war reconstruction, the Government were prepared to take bold decisions as to what we were to do in the future, and were now actively considering what these should be.

How a beginning might best be made was not discussed in much detail. Mr. Oliver Simmonds asked if the Government had considered setting-up a Joint Standing Committee of both Houses, a course which *Flight* suggested some time ago, but he did not draw more than a vague reply.

Control of Civil Aviation

MORE than one speaker in the debate expressed the view that the Air Ministry has consistently mishandled civil aviation, and that now the time had come to remove it from Air Ministry control. Mr. Perkins was rude to members of the Air Council whose interest in civil aviation, he said, did not begin until they were getting elderly and were looking around for directorships in the operating companies. He merely suggested as an alternative that civil aviation should be handed over "to some other Department." Sir Lindsay Everard was more explicit and, therefore, more constructive. His argument was: "Until we get a Minister for Civil Aviation we shall never really make headway." Mrs. Tate agreed that it should either be under a department of its own or under the Board of Trade.

Flight has for many years supported Air Ministry control of civil aviation. That was because the whole development of flying was still in a state of evolution, and the only alternative suggested was that of handing it over to the Board of Trade. We could not, and cannot now, imagine any department less fitted to handle post-war commercial flying in the grand manner that will be needed. As Mr. Perkins truly said: "Never were the stakes so high as they are now, and never was there such a grand opportunity as we have now." Circumstances have changed, and the time has probably come for giving civil aviation its own Secretary of State. That the Government is fully alive to that possibility

emerged from Capt. Balfour's reply, when he admitted that, although standing there as the representative of the Air Ministry, he was not going to say that it was right that civil aviation should for ever remain with the Air Ministry. "We have to start with fresh minds and a fresh outlook on all these problems."

Transport Aircraft

As we mentioned briefly last week, Mr. Perkins had heard of the *York*, which he described as a bomber converted to use with the Army. Capt. Balfour denied this, and said the machine was virtually a redesign of the bomber. Both may quite well be correct. If, for example, the *York* had a bulky fuselage substituted for its original bomber fuselage, it would be difficult to decide whether to regard it as a conversion or as a redesign. Mr. Perkin's plea for 20 of these machines at once, and ten Sunderlands, to get British civil aviation established quickly, did not receive much encouragement from Capt. Balfour, who said that although a considerable number of Sunderlands were coming into the British Overseas Airways Corporation, it would be misleading to think that the *York* (he called it "this particular machine") would be coming forward in sufficient numbers for the Corporation to receive any in the early months of 1943.

The whole point is that if those responsible for policy had foreseen—as they should have done, they had enough warnings—that large numbers of transport aircraft would be needed for the Services, we should have had a reasonable number of suitable aircraft in the earlier stages of the war. The Air Council ordered no bomber-transports after the Bristol Bombay, and commercial aviation was semi-starved and had few machines, most of these being commandeered on the outbreak of war, including the De Havilland Flamingo, which was too small to be used as a bomber-transport. Small wonder, therefore, if the *York* output is likely to be absorbed by the R.A.F. for many months to come.

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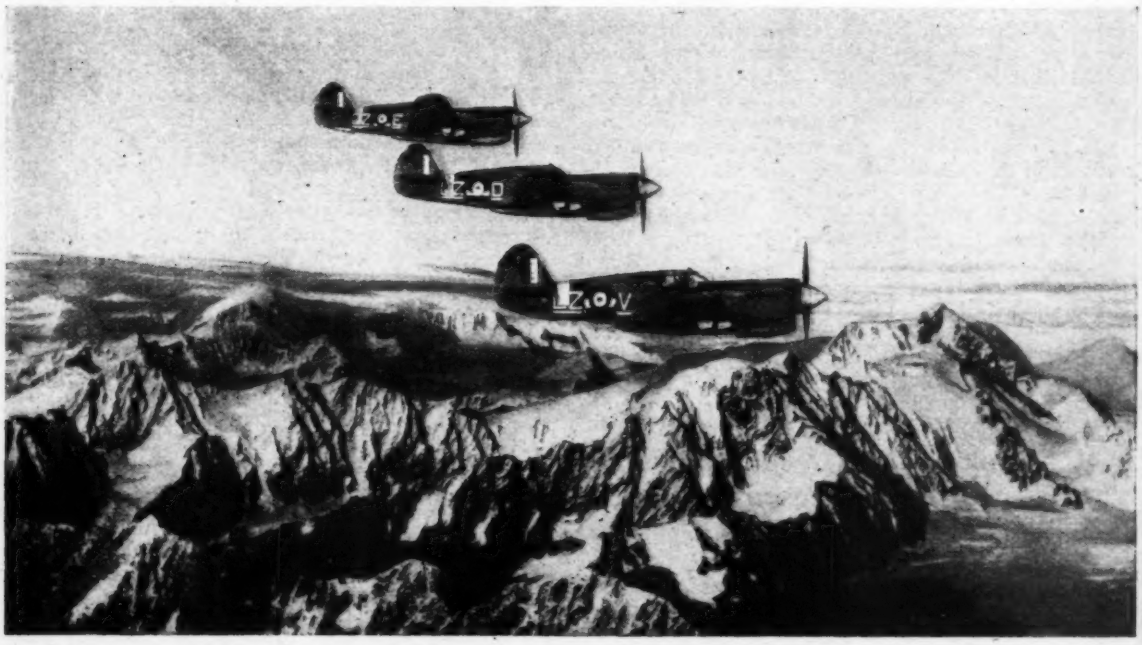
Straws

WHILE Parliament has thus been discussing the future of commercial aviation, signs are not lacking that the shipping interests are keeping their eyes on post-war developments. In a recent article in *The Times* a ship owner discussed the future of British civil aviation, in which he outlined the circumstances in which shipping and civil flying have developed. He pointed out that among the causes of the poor showing made by British commercial aviation were the vacillating policy of successive Governments, and the restrictive clauses of the I.C.A.N. The views of the author were summed up in the words: "The operation of a regular airline and that of a regular sealine have wholly sympathetic characteristics."

More recently, on the occasion of the annual general meeting of the P. and O. Line, Mr. A. O. Lang, deputy chairman of the line, said: "It will be appreciated that post-war conditions cannot be forecast with any degree of accuracy, but your board is constantly considering all likely developments, and it may be that powers will require to be taken to permit of the company engaging in air transport of passengers, mails and freight as complementary to its sea service."



AMERICA'S WESTERN FRONT OF THE FAR EAST. Kittyhawks of the Royal Canadian Air Force patrolling over the mountain ranges of Alaska.

War in the Air

AD INFINITUM: Hurricane IIs in echelon over Tripolitania. As ground strafers the Hurricane squadrons have played havoc with enemy tanks and vehicles.

General Pienaar Killed : Libya Air Force in Pursuit : Air Strips Taken at Buna

THE whole British Empire mourns the loss, in an air accident, of Maj. Gen. Dan Pienaar, the leader of the South African division in Libya. He is the second distinguished General lost to the Empire while flying on duty during 1942. The first was Gen. Gott, who was reckoned one of our finest tank commanders, and whose machine was shot down by the enemy. As we write, the cause of the accident which cost us Gen. Pienaar is not known. It seems specially lamentable that two men who had survived very many perils while in battle with their own commands should have lost their lives while travelling in a vehicle of war with which they were neither officially concerned.

Disappointment is undoubtedly felt that Rommel's rearguard managed to escape from the clever enveloping movement which was designed to cut it off at the Wadi Matratin. This must have been intensely disappointing to the New Zealanders and the British armoured column which made the detour in the hope of capturing or destroying the majority of that rearguard. The hardships of desert campaigning must be bad enough at the best of times, worse when either advancing or retreating at speed, but worst of all when a special effort of that sort has to be made. The German commanders deserve credit for their skill in promptly extricating the majority of their force from what was a very threatening position. Of course, they did not get away unscathed. Apart from men, guns and lesser matters, they lost 20 tanks, and it is believed by correspondents on the spot that that number is an appreciable proportion of the armour which Rommel has left. At the least, it is more than he can conveniently spare.

Clearing Airfields

THE speed with which the R.A.F. followed up was amazing. Their difficulty was, of course, that as the Germans evacuated a landing ground they sowed mines all over it. The R.A.G. ground crews and detachments of the R.A.F. Regiment followed on by motor transport at all speed and set to work to clear the landing grounds. One hopes that they did not lose many men in the process, but at any rate they got the work done. Transport aircraft then flew up the necessary ground equipment, and the fighter-bombers landed and made ready. As a result, the latter were able to attack the retreating Axis columns at a point where they must have thought themselves safe from pursuit for the time being.

Perhaps, by the time these words are published, Rommel's intentions may have been made manifest beyond all doubt. At the moment it looks as if he is prepared to sacrifice all Tripolitania and means to try to link up with the German forces in Tunisia. These latter have been having their own troubles. Admiral Cunningham has reckoned that lately the Axis has

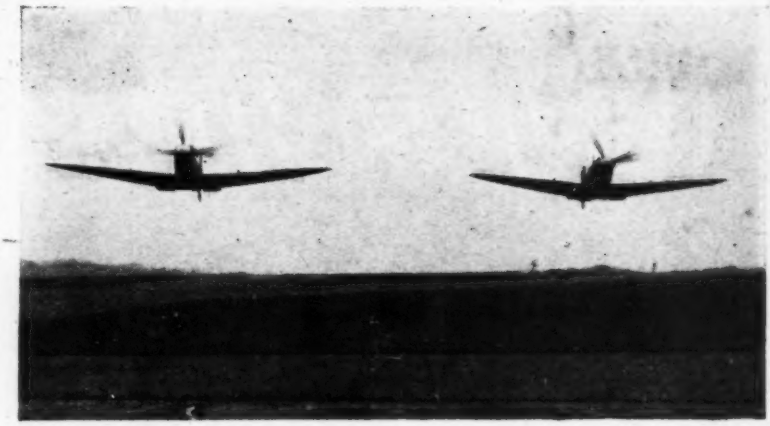
A.O.C., R.A.F. NORTH AFRICA: Air Marshal Sir William Welsh, K.C.B., D.S.O., A.F.C., on an advanced airfield in Algeria.

WAR IN THE AIR

been losing an average of a ship a day in the Mediterranean, adding that the submarines and the Fleet Air Arm were doing very well. There has been a period of marking time in Tunisia, which has allowed General Eisenhower to build up his strength in forward positions, and especially to get fighters forward to the help of the British First Army. French strength has also been growing and making itself felt more pronouncedly.

Against Japan

IT came as a pleasant surprise to read that the Allies had succeeded in landing tanks on the northern shores of New Guinea, and had used them against the remaining blocks of Japanese troops still clinging to beaches and the Mission house round Buna. They saved many casualties among the Australian and American infantry, who have been slowly working their way forward against the strongly entrenched Japanese infantry. With the help of the tanks our men have seized several "air strips," as correspondents call them, on the beaches. The enemy does not seem to have had any air support for a considerable time past, whereas Allied bombers have been pounding away at the entrenched positions. It must, however, be far from easy to plant a bomb directly into a slit trench. As the veterans of 1914-18 know well, it takes a multitude of shells to do much damage to well-dug earthworks. The Japanese have made repeated attempts to get reinforcements to their men on the beaches, who are certainly showing the traditional doggedness of the Japanese soldier. Japanese airmen, according to General Rickenbacker, have begun to deteriorate in quality, which indicates that the recklessness with which they have sacrificed their lives in earlier fights has put too heavy a strain on the training schools of Nippon.



STRATOSPHERIC FIGHTERS: Two of the new Spitfire Mk. IXs with Merlin 61 engines taking off from the runway of one of our fighter stations.

Something sensational may have happened in Burma before the New Year has gone very far upon its way. The R.A.F. and the Americans in India have been bombing Japanese bases and airfields with increasing vigour and regularity, and before Christmas the infantry of the Army in India made a small advance south of Chittagong, without meeting with any opposition. Perhaps it was these moves which stung the Japanese into making some air raids on Calcutta. This city is the second most populous in the British Empire, and bombs in the crowded bazaars would certainly do a good deal of damage, not to military targets but to civilians. The hazards of war will be an unpleasant novelty to the town-bred population of this great Capital of Bengal, and panic in the Indian quarters might develop into something appalling. The people stood up well, however, to this first taste of bombing, and received a message of congratulation from H.E. the Viceroy.

AERIAL TROOP TRAIN: Airborne troops deplaning from Airspeed Horsa gliders and going into action.

The Russian Offensive

ONE is simply amazed at the extent, and the sudden success, of the great Russian offensive recently launched. It has come at a time when the winter has a paralysing effect on the German armies, without robbing the Russians of their power to move and to fight. Also, it has come at a time when numbers of *Luftwaffe* squadrons, and other troops as well, had to be withdrawn from the Eastern front and hurried over to Tunisia. The second front there is producing its due effect, and is not less effective because it has been launched in Africa instead of in Europe. In fact, it creates more difficulties for the Axis, as the Germans cannot use the railways of Europe to take the troops which they send to meet it right up to the firing line. They have to cross the sea, either by steamer or by air transport, and both are vulnerable to the attacks of the Royal Navy (including the Fleet Air Arm) and the Royal Air Force. At the same time Hitler must be cursing the necessity to use his air transport machines in two directions instead of concentrating them on one at a time. He has to keep his isolated forces in Russia supplied by air. That sort of thing is not his idea of a good war.

External lines have obvious disadvantages, but they have advantages too, when one's strategy is wisely planned, and now they are certainly causing the enemy a good deal of embarrassment. They operate in favour of the Power which has command of the sea, and so far the U-boats have not robbed the British Empire and the United States of that advantage. In fact, although the U-boats still

ENEMY AIR LOSSES TO DEC. 26th.

	Over G.B.	Over Continent.	Middle East.
Dec. 13	0	0	6
" 14	0	0	2
" 15	1	0	5
" 16	2	1	2
" 17	3	0	6
" 18	1	1	3
" 19	3	0	5
" 20	1	0	2
" 21	0	2	1
" 22	2	0	4
" 23	0	0	1
" 24	2	0	0
" 25	0	0	0
" 26	0	0	0
	15	4	37

Totals: West, 6,528; Middle East and French Africa, over 5,136.

cause us all some anxiety, the landing of the Anglo-American forces in French Africa has been the most decided slap in the face which a submarine force has ever had to accept.

Later News

THE capture by the Russians of 300 German aircraft on an airfield 175 miles to the west of Stalingrad, in addition to the capture of a train on which another 50 were loaded, will add to Hitler's discomfort. At the present time of year there can only be occasional days in Russia when flying is possible, and as the Germans are still presumably stronger in the air than the Russians, this must tell to the advantage of our Allies. Moreover, the various groups of encircled German troops depend very largely on supplies by air, which cannot always arrive with the regularity of a railway in peacetime. It is in the winter that the Russians turn out their horsed cavalry, mainly Cossacks, which can get about the country when mechanical transport, whether on the ground or in the air, is most severely hampered in its movements.

It is reported by the Russians that the German troops are not much better equipped to withstand the winter than they were last year, despite Hitler's promises and boasts. Our Allies have taken vast numbers of prisoners, so they are in a good position to form an opinion.

The public has read with rejoicing that Spitfires have been in action in Tunisia against the Axis forces there, in addition to American fighters. No General is happy, and certainly no troops can enjoy things, unless fighter aircraft can at least hold the balance over a battlefield; if they can dominate it, so much the better. General Anderson's troubles have been mainly due to outrunning his fighter umbrella—though it was, no doubt, well worth while to take that risk. When the Anglo-American forces have established fighter superiority, which they certainly can do even if it does take a little time, things will probably move faster.

The assassination of Admiral Darlan has no concern with the air side of the war, but it will probably result in the French forces in Africa fighting with still greater enthusiasm under General Giraud. Those forces must be badly off for aircraft (in that respect the French Army in France was badly off in 1940), and they will have to be supplied by the British and Americans. That will mean further demands on their production and transport; but it is none the less an inestimable boon to have those gallant French legions fighting once more on the side of the Allies, even though they have to be supplied.

BRITISH & U.S. AIR LOSSES TO DEC. 26th.

	Over G.B. A'crft.	Over Continent B'brs.	Over Continent F'trs.	Middle East A'crft.
Dec. 13	0	2	1	4
" 14	0	0	0	2
" 15	1	0	0	4
" 16	0	1	0	0
" 17	0	18	0	2
" 18	1	0	0	2
" 19	0	0	0	3
" 20	0	12	0	3
" 21	0	12	0	3
" 22	0	2	1	0
" 23	0	0	0	0
" 24	0	0	0	1
" 25	0	0	0	1
" 26	0	0	0	1
	2	47	2	26

Totals: West, 4,999; Middle East and French Africa, about 1,999.

TUNISIAN CONVOY SINKERS: Fleet Air Arm pilots and torpedo aircraft on a North African airfield.

A.T.A. BENEVOLENT FUND

WE publish below the third list of subscriptions to the A.T.A. Benevolent Fund. This fund is to help employees of the A.T.A. who meet with an accident while on duty, and to aid dependants of those who lose their lives. Contributions, which are urgently needed, should be sent to The Hon. Treasurer, A.T.A. Benevolent Fund, Air Transport Auxiliary, White Waltham, Nr. Maidenhead, Berkshire.

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E. C. Bowyer, Esq	10	10	0
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The Eighty-one Factory Recreation and Social Club	15	3	1
Westland Aircraft, Ltd.	21	0	0
Newton Brothers (Derby), Ltd.	5	5	0
	£3,407	14	9

AIR POWER IN 1942

A Year of Recovery : From Defence to Aggression : Britain's Darkest and Brightest Hours : Heroism in Defeat as in Victory.

By MAJOR F. A. de V. ROBERTSON, V.D.

Mr. Winston Churchill in the cockpit of the Boeing *Berwick* on which he returned from the U.S.A. By flying he was able to visit America, Russia and the Middle East.

THE year 1942 has seen a tremendous change in the fortunes of war. Fortune, said some poet, favours the brave. Some other man, possibly Napoleon, said that it was on the side of the big battalions, while another authority has declared that it followed good organisation. The past year has seen a huge increase in the battalions of the United Nations, and it has also seen a great advance in their organisation for war. In particular, the year has seen progress made in estimating the proper relation of air power to other forms of conflict.

In January, 1942, the war in the West was in a condition of marking time. The Royal Air Force had discovered that short-range fighters could be used for aggression as well as for defence. Fighter Command had begun the policy of sweeps over the occupied countries over North-western Europe, which have continued throughout the year. Their object was to hold German fighter squadrons there, to prevent them from going to Russia, and to force them to fight when the enemy's desire was to avoid using up his aircraft.

It was found that if R.A.F. fighters flew by themselves over France, the German fighters would for the most part let them alone. Therefore, light bombers, Blenheims or Bostons, were sent over with the fighters, and that *forced* the German fighters to take to the air. It was a novel conception to use the bombers as subsidiary to the fighters, a reversal of earlier ideas, but it achieved its object. About 50 per cent. of the German fighter strength was contained in the West, and could not be used on the Eastern front.

The Battle of the Atlantic was not going too well for Britain and America, and what affected the two great producing countries also affected Russia. With this struggle in a critical condition, the presence of the three German warships, *Scharnhorst*, *Gneisenau* and *Prinz Eugen* in the harbour of Brest was a constant menace. Consequently, the Higher Command, either the War Cabinet or the Ministry of Defence, laid it as a first charge on Bomber Command that these ships should be constantly attacked, in all possible ways, usually by night but sometimes by day, to prevent them from getting loose into the Atlantic to prey upon the Anglo-American convoys.

In the inter-war years, when all doctrines of using air power were really academic, it had been held that a fleet in harbour would be so much cold meat for bombers. The Japanese attack on Pearl Harbour showed that that doctrine was sound, *provided* that no provision had been made for anti-aircraft defence, but *only* with that proviso. Brest, and afterwards Malta, showed that if the A.A. and fighter defence was sufficiently strong, warships could not only continue to exist, but could also be repaired and got ready for sea, despite desperate bombing attacks.

The wreckage of the Renault Works near Paris after a concentrated attack by Bomber Command.

Scharnhorst and Gneisenau

The Brest incident cost Bomber Command considerable losses in machines, and also restricted the volume of bombing attack on German production centres. Still, Brest was made very unhealthy for those three vessels, and in the middle of February the Germans took the risk of bringing them out and escorting them all through the Channel to safer harbourages. It was a very daring move, and it succeeded, largely because it was the last thing which the British authorities had expected, but also because the German fleet was able to move under the protection of shore-based fighters all the way till past the Straits of Dover.

Another feature of the opening months of the year was the initial experiments in Combined Operations by all three Services, which took the form of raids on various Norwegian

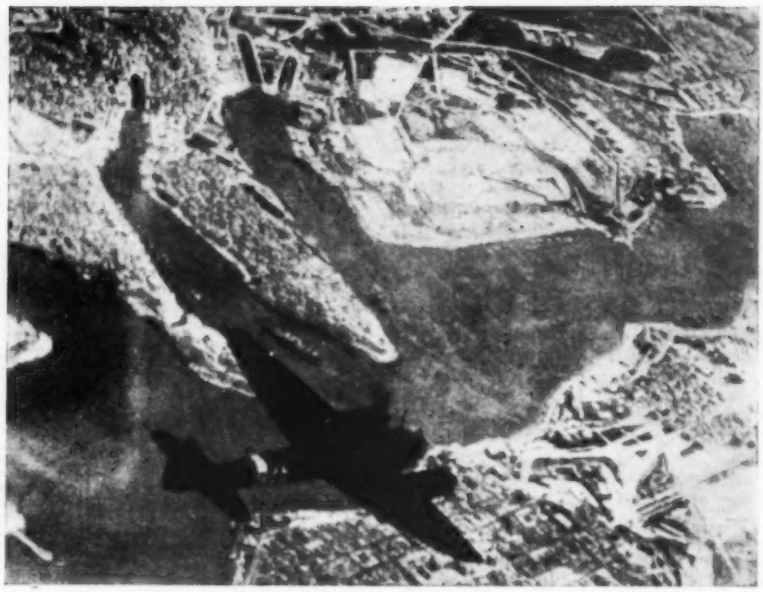
islands. These Combined Operations were destined to develop into something much greater and more promising before the year was out. In fact, a steady advance in using Navy, Army and Air Force in combination has been one of the distinguishing signs of progress of the year.

Singapore

If the war in the West was in a fairly satisfactory and hopeful state in the early winter months of the year, the state of affairs in the Far East was calamitous. Hong Kong had fallen, the American Pacific Fleet had been temporarily rendered powerless by the sinking or damaging of its eight battleships at Pearl Harbour; H.M.S. *Prince of Wales* and *Repulse* had been sunk by Japanese torpedo-aircraft; America had lost the Philippines (despite the heroic stand by Gen. McArthur's men on Bataan and Corregidor); and the Japanese were advancing from Indo-China and Siam down the Malay Peninsula. On February 15th Singapore capitulated ("the greatest disaster in our military history," as Mr. Churchill said), and the Dutch islands of the East Indian Archipelago soon went the same way. Burma was next overrun, and then both Australia and India lay under the threat of a Japanese invasion. It was a parlous situation for the Allied Nations.

In all of these operations air power played its part. Pearl Harbour teaches no lessons, because it was a treacherous attack while Japan and the United States were still at peace, and there was no effective defence. The loss of the two British capital ships calls for comment, because there still seem to be misapprehensions about what happened. Nobody made the mistake (which would have been a criminal mistake) of overlooking the importance of air cover in a naval operation. If a British carrier had been available it would have accompanied the fleet, but by extraordinary bad luck none was then available.

Admiral Sir Tom Phillips knew, when he set out, that he would have no air support (for the catapult seaplanes, probably all Walruses, carried on his ships were only useful for reconnaissance and gun-spotting), and he decided to take the risk. He may have reflected that if he stayed in harbour in Singapore his ships would be bombed there, and the A.A. defences of Singapore were not on the scale of those at Brest. If he had succeeded in getting at the Japanese transports with his heavy guns he would assuredly have sunk the lot and might have saved Malaya. When Japanese aircraft spotted his ships he returned, still keeping wireless silence. At the spot where he was attacked he was actually within range of a fighter base on the mainland, and an hour after the disaster some R.A.F. fighters flew over the scene. But, owing to the wireless silence of the fleet, which was perhaps discreet in the circumstances, the shore-based fighters did not know of the fight until too late; and in any case so few fighters were available that it is doubtful whether they could have averted the disaster.



A Ju 88 over Grand Harbour, Valetta Malta. Reinforced by fighters flown from aircraft carriers, Malta decisively beat the attempts by the *Luftwaffe* and *Regia Aeronautica* to reduce the Island.

The devastation in the Luxemburger Strasse area after the 1,000-bomber Cologne raid on the night of May 30-31.

AIR POWER IN 1942

It has been asserted by some observers that a few squadrons of Hurricanes might still have saved Malaya, but the assertion does not seem well founded. Japanese aircraft worried and discouraged our troops, but much of the fighting was in jungle, where aircraft do not count. It was the Japanese command of the seas, and their ability to land troops behind our battalions, and to keep on repeating the process, which lost us Malaya. In fact, as Field-Marshal Smuts has pointed out, once Vichy had handed Indo-China over to the Japanese, the loss of Singapore was inevitable. The gamble which Admiral Phillips took was, if it had come off, probably the only thing which might have saved the situation. If a carrier had been with him, everything might well have turned out differently. Singapore was not an Army fortress but a naval base, and its original air garrison had been selected for work with the Fleet, not with an Army.

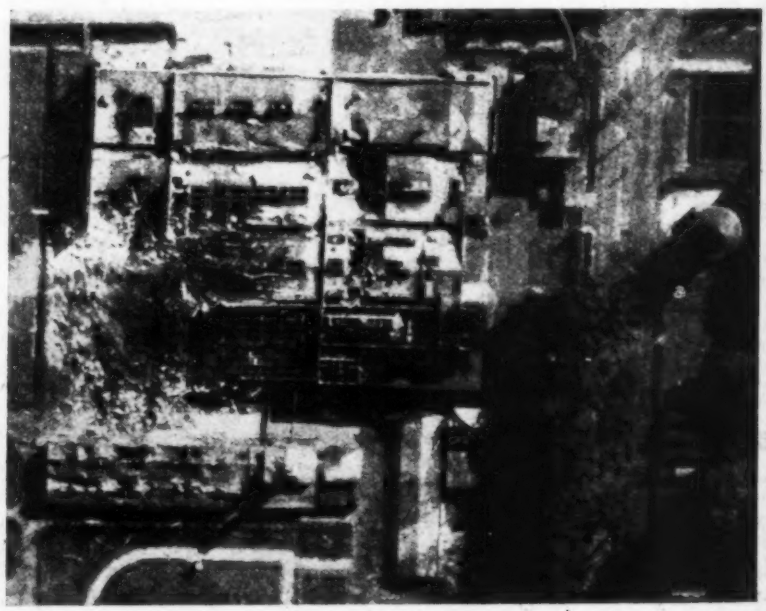
Burmese Campaign

The British loss of Burma was a repetition of the Malayan campaign, with the exception that General Alexander conducted the retreat with the greatest skill, and so earned the right to win the great Battle of Egypt later in the year. Again the British forces were short of aircraft, and again it is doubtful whether air superiority, if we had had it, would have made much difference to the final result. Once again the crucial matter was command of the seas. Burma can only be reinforced from India by sea, and the Japanese fleet commanded the Bay of Bengal.

Against the long tale of defeat in the Pacific and Burma, one incident can be recounted with satisfaction, namely, the appointment, at President Roosevelt's suggestion, of General Wavell as Commander-in-Chief of all three Services, American as well as British, and also including the Dutch, in the South-west Pacific. That was a tremendously significant move, and a precedent which has since been followed in other cases. General Wavell did not hold that command for long, but now the very gallant American, General MacArthur, holds it, and has his headquarters in Australia.

In the war of 1914-18 the Allies suffered much from lack of unity before Marshal Foch was appointed Generalissimo of the Armies in the West. Moreover, in 1915 the First Lord of the Admiralty (a certain Mr. Winston Spencer Churchill) tried to force the Dardanelles with the Navy alone. Strategically it was a grand idea, but tactically all wrong, because co-operation by the Army was a necessity, and that was not forthcoming until it was too late. The United Nations do not intend to make that sort of mistake this time.

In May a big raid was carried out on Rostock and the Heinkel works. Direct hits were scored on the erecting shops. (1) Holes in the roof. (2) Salvaged Heinkels dragged out of the wreckage.



The Focke-Wulf aircraft factory which received very severe damage in the "over 1,000" raid on Bremen in July.

For a considerable time Australia was defended almost entirely by bombers, which harried the Japanese bases in New Guinea to such effect that time was given for the mustering of other forces. That was a strange campaign, but even more strange were the two American victories of the Coral Sea and Midway Island. The Japanese had battleships as well as carriers and other craft. The Americans could only fight with cruisers and carriers, for their battleships were under repair. That meant that they could not venture on a regular naval battle, so they fought at long range with aircraft, and in each case they won.

If the Japanese had had no carriers, these battles would have been easier to understand; but they were well off for carriers, and one is puzzled to see why, with such air help, the Japanese Admirals did not succeed in bringing their battleships within gunfire range of the American cruisers and sinking them all. Once, by night, they did

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sink three heavy American cruisers and H.M.A.S. *Canberra*, by gunfire, but the balance of the sea fighting went heavily against the enemy, and his losses in carriers were especially severe. By October the United States was once more able to use battleships in action, and in a long fight off the Solomons Vice-Admiral Halsey heavily defeated a Japanese naval force which went into action without a carrier at all.

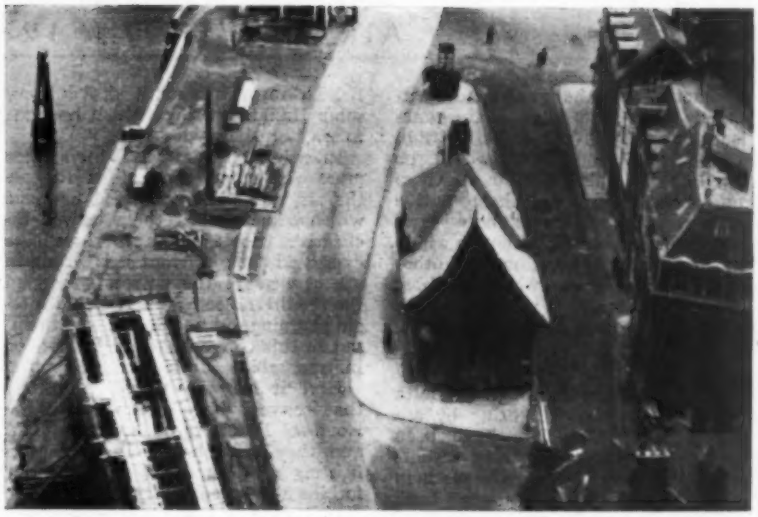
Second Libyan Advance

That sea fight off the Solomons is one of the cheering events which accompanies the closing of this remarkable year. The spring, however, continued to bring gloomy news from the Far Eastern front. In April the Japanese, who had occupied the Andaman Islands in the Indian Ocean, sent aircraft carriers against Ceylon. Two County class cruisers, H.M.S. *Dorsetshire* and *Cornwall* and the old carrier H.M.S. *Hermes*, were based on Trincomalee, and all put to sea as the Japanese approached, though the *Hermes* steered a different course from the two cruisers. All three were sunk by dive-bombers from the Japanese carriers. It is worth notice that the *Hermes* is so far the only British carrier to be sunk by air attack. The *Glorious* was sunk by gunfire from a powerful German warship, and the *Courageous*, *Ark Royal*, and *Eagle* by U-boat torpedoes.

In the Middle East the year did not open in such an unpromising way for British arms as it did in the Far East. General Ritchie, who then commanded the Eighth Army, was advancing, and Benghazi was once more in British hands. This was only a flash in the pan, for when Rommel reached Agheila he turned, and, having received reinforcements he advanced, driving the Eighth Army before him. He recaptured Benghazi about the same time that Singapore was lost, or a little earlier.

During this campaign the Air Forces which Air Chief Marshal Sir Arthur Tedder had at his command outnumbered those of the Axis, and there were many searchings of heart as to why that did not mean an outright, complete British victory. People had been educated by enthusiastic writers to believe that the air was the decisive arm in all forms of warfare—whereas the Higher Command evidently knows that the only decisive thing is a well-balanced force with a due proportion of all essentials, of which the air is a very important one.

Once again it should be repeated that Combined Operations is the keynote of this war, as of most other wars. Mr. Lyttelton explained in Parliament that air superiority is of less value in the desert than in enclosed country, and the facts bear him out. Quite plainly it had been decided between the G.O.C. and the A.O.C.-in-C. that in this advance the aircraft should not try to intervene in the actual fighting to any extent, but should concentrate on attacking the Axis lines of communication, and especially on the petrol supplies. To these great damage was done, but not enough to immobilise Rommel's forces. On the ground Rommel was superior to Ritchie in tanks and in guns, and that was the cause of the British defeat. But as the British forces retreated, many vehicles necessarily using the single road along the coast, which would naturally attract the enemy's bombers, the superiority of the R.A.F. fighters prevented the retreat from becoming a rout. General Auchinleck was able to get the majority of his force safely back to the position at El Alamein, where he stood at bay until he gave over his command to General Alexander.



Fighters, fighter-bombers and fighter reconnaissance machines came into their own during the Dieppe raid at the end of August, 93 enemy machines being destroyed for certain. The photograph of Dieppe is one taken from 50 ft. by one of our Army Co-operation machines.

At the same time General Montgomery relieved General Ritchie in command of the Eighth Army. So the front remained throughout the heat of the summer, while the long lines of ships brought more troops, tanks and squadrons round the Cape to Egypt, and the British public wondered what would happen if Rommel captured Egypt.

El Alamein

During the summer the Prime Minister visited the Middle East, and in July he informed Parliament that he had laid it down that the entire Air Force should be subordinated to the purposes of the military commander. Before a battle the Army Commander would specify to the Air Officer Commanding-in-Chief the tasks which he required to be performed, and it was for the latter to use his maximum force for those objects.

From that time a change came over the scene in the desert fighting, partly, of course, because the Axis forces, wedged on a narrow front between Alamein and the Quattara depression, presented numbers of easy targets to bombers and fighter-bombers. These squadrons undoubtedly did play a very active part in ground operations, and one heard of Army units, when in difficulties, being able to call for the help of bombers or fighters and receiving it with great promptitude. The Air Force gladly gave of its best to help the Army in every way, and the result was eminently satisfactory—in fact it contributed largely to the ultimate victory.

The Middle East front includes the Mediterranean and Malta. The story of Malta is an epic by itself, and no George Cross was ever better deserved than that which H.M. the King bestowed upon that indomitable island. It was always a thorn in the side of the Axis, and whenever Rommel was in urgent need of reinforcements there was sure to be a heavy outbreak of raids on Malta, in the hope of keeping the island's bombers from interfering with the convoys. The Prime Minister said that at one time Malta had only a dozen fighters, though he did not specify the time. Fighters were taken to the vicinity in carriers and then flown off to the island. The U.S. carrier *Wasp* (afterwards sunk in the Pacific) took part in these reinforcement efforts. Early in September the First Lord of the Admiralty, Mr. Alexander, stated that carriers had made 35 trips of the sort, and had delivered 815 fighters to the island.

Convoys also had to get through to the island with food and ammunition, as well as other things, for Malta cannot support herself in any way. Her A.A. guns must use up vast quantities

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of rounds, and the gunners are extremely good shots after all the practice which they have had. No mention of this glorious defence would be complete without a tribute to those gun crews, many of them native Maltese. The islanders bore their ordeal with a stubborn gallantry which has aroused the admiration of all other places which know what bombing means, and London is not least in the degree of her sympathy.

Malta Supplied

Getting a convoy through to Malta always meant heavy fighting by sea and in the air. There have been several of these desperate affairs during the year. One took place in June, when one convoy started from Gibraltar for Malta, and another from Alexandria for Tobruk. Of the latter, most of the ships had to turn back after finding a strong contingent of the Italian Navy across its path—but, in any case, Tobruk was captured by Rommel shortly afterwards. The other convoy was got to Malta after severe fighting, with losses in ships and aircraft on both sides.

There was an even sterner battle in August, when a very large convoy started from Gibraltar for Malta. The escorting fleet included three carriers, and the Admiralty had intended to work out a new plan in which three carriers should work together, but the idea was partly spoilt because a U-boat sank H.M.S. *Eagle* early in the action. U-boats sank two cruisers as well, but enemy aircraft could only claim one destroyer among the ships of the escort. The naval fighters, Sea Hurricanes and Martlets, and the A.A. gunners on the ships held off the bombers and torpedo aircraft which the Axis sent against the convoy, and inflicted heavy losses upon them. On the other hand, British torpedo aircraft drove away some Italian warships which had put to sea.

In brief, short-range fighters once more vindicated their claim to rule the air, and the shore-based bombers which came against them proved ineffective. Some good authorities have expressed the view that it is wrong to use carriers in the narrow waters of the Mediterranean, and Italian strategic planning did not provide for them, but in this convoy battle they proved indispensable. Malta got her supplies.

Here it may be mentioned briefly that convoys have been sent to the North of Russia throughout the year, and they, too, have entailed heavy fighting and some losses, but space forbids a detailed description.

If the spring of 1942 was a depressing time of set-backs and positive military disasters for the United Nations, the summer was a period of waiting, in which the only way in which Britain was able to hurt the enemy was by bombing German production centres—of which more below.

The Turn of the Tide

The autumn saw a drastic turn of the tide. It began on October 9th, when rains had waterlogged the Axis fighter airfields in Libya, and the R.A.F. bombed them so effectually that Kesselring's fighter strength was reduced to ineffectiveness. For days the R.A.F. went on battering at the enemy's air power.

Then, on the night of October 23rd, General Montgomery's artillery opened a terrific barrage on Rommel's positions. There followed a period of ten days during which the British infantry and artillery cleared a way for the armour. During this time the R.A.F. gave every kind of help of which it was capable to the fighting men of the Army; that was the second stage. The third stage came when Rommel retreated, and then the R.A.F. was switched over to the coast road, where it did untold damage and converted the retreat into something like a rout.

About the same time the Russians won a victory in the Caucasus and also advanced determinedly to the north and the south of Stalingrad. The Australians drove the Japanese back across the Owen Stanley range in New Guinea, and the Americans improved their positions in the Solomons. Allied aircraft and warships, but chiefly aircraft, defeated several Japanese attempts to reinforce their troops on the islands.

Above all, a very large Anglo-American force suddenly landed in Algeria and Morocco, taking the Axis completely by surprise.

"Ring in the New"

And so the year ends with the United Nations pressing the Axis hard on every side. There must be hard fighting before General Eisenhower and General Anderson, helped by French forces under General Giraud, turn the Germans out of Tunisia and seize the important points of Bizerta and Tunis—but the end is not in doubt. Rommel's Afrika Korps has been driven past the Agheila position and is being pursued deep into Tripolitania. The Russians have assumed the offensive at many points of their long battle front, and have advanced magnificently. Many bodies of German troops are threatened with encirclement and destruction. General Wavell in India has opened a cautious offensive, mainly by air, against the Japanese in Burma. In New Guinea the Australians and Americans have won a great victory. Things are going well in the Solomons. We all look forward to 1943 with high hearts and high hopes.

An attack by Ju 88s on a Russian-bound convoy. To combat air attacks on ships a number of merchantmen carry catapults and fighters. It was on the Murmansk route that Seafires were first used from aircraft carriers.

Big daylight raids by four-engined heavies have been a feature of bomber operations during the latter half of the year. This photograph shows part of the 94 Avro Lancasters which raided the Schneider works at Le Creusot.

Mention has been made above of how Fighter Command turned from defence to aggression, and also of the Battle of the Atlantic. The part played in the latter by Coastal Command would provide material for many books. Considerable developments took place in its attacks on shipping. The Beaufort has proved a useful torpedo aircraft, but during the year it was helped by the more powerful Hampden, no longer required as a first-line machine by Bomber Command. Sometimes Coastal aircraft had the luck to find and attack German warships off Norway. The system of launching fighters by catapult for the defence of convoys against enemy air attack was developed, and the new organisation was entitled the Merchant Ship Fighter Unit.

Anti-U-boat Patrols

Long-range reconnaissance over many seas took up most flying hours, and when the Sunderlands and Catalinas saw U-boats they attacked them with bombs. Stories of these attacks made a strong appeal to the public, and perhaps it was not always realised that the best part of the work done by the Coastal aircraft was reporting the whereabouts of U-boats to the Navy, and at the same time keeping the boats submerged.

Towards the latter part of the year Coastal Command paid much attention to the Bay of Biscay, where U-boats and Condors mainly set out to harry our Atlantic convoys. The Germans replied by despatching long-range fighters, often Arado seaplanes, over the Bay to attack the British reconnaissance machines. Coastal Command, in turn, sent Beaufighters over the Bay, and they accounted for a number of enemy machines. The work of Coastal Command never eases off, but is constantly growing.

Bomber Command

DURING the year Bomber Command developed the tactics of the concentrated raid by heavy four-engined bombers dropping bombs of the heaviest calibres, including those of 4,000 and 8,000 lb. By very careful organisation a force which might number up to 1,000 machines would drop all its bombs in a short time, often in less than an hour, mixing the H.E. bombs with enormous numbers of fire-bombs. The way would be led by specially skilful air crews who would light up the target with flares. These were called "Pathfinders," and were given a special badge. This concentration overwhelmed the defences, and gave the fire brigades no chance to deal with the conflagrations.

The first raid by 1,000 machines was made on Cologne on the night of May 30th, and a few nights later Essen was treated to a similar dose. Other very heavy night raids were made on Lubeck, Rostock, Pilsen, Bremen, Wilhelmshaven, Hamburg, Kiel, Osnabrück and Gdynia. There were many others, but space forbids mention of them all. A day raid on Danzig in July involved a flight out and back of 1,750 miles. A number of these raids had as their chief object damage to U-boat construction.

Bomber Command believes in variety of tactics, and it is surely a very sound principle. There have been notable day raids by formations of Lancasters flying low. The diesel works at Augsburg were raided that way in April, and so were the Schneider works at Le Creusot on October 17th. In September the Mosquito bomber made a sensational first appearance by a daylight raid on German headquarters in Oslo. On various other occasions single bombers, often Wellingtons, have gone out by day and surprised some German works. In October the Eighth American Army Air Force sent Fortresses by day over Lille with a strong escort of Spitfires. Enemy fighters contrived to evade the escort and attacked the bombers, but suffered very heavy losses from the numerous heavy machine-guns of the Fortresses. This type seems specially suitable for day bombing.

As soon as the Allied offensive in North-East and North-West Africa had got under way, it became of prime importance to hit the ports and factories of Italy, and Bomber Command was immediately commissioned to hammer Genoa, Milan, Turin, and other places. This was done most effectively in a series of raids. In December it was published that the Ninth U.S. Army Air Force had established its headquarters in Cairo, and it joined in the attack on Italy by sending heavy bombers to raid the port of Naples.

We shall probably have to wait until after the war is over to learn the exact effect which the bombing campaign has had on the movements and powers of the German armies and fleets of U-boats. It is a fact that Bomber Command often has had to divert its activities to helping the other Services, which diminishes the amount of damage it could do to enemy war production. It is also true that the majority of bombers produced in Britain have to be exported to Russia and to the Middle East.

Other events of the year which deserve notice were the formation of the Royal Air Force Regiment, which has been in action in Libya; the development of airborne troops, who have been in action in Tunisia, and the Glider Pilot Regiment in the Army; and the part played by R.A.F. and naval aircraft in various Combined Operations, including Dieppe and the occupation of Madagascar.

HERE AND THERE

Training for Peace

IN the midst of waging a relentless war against U-boats and enemy shipping, pilots and aircrews on a Coastal Command station are fitting themselves for peacetime civilian posts.

The Australian Adjutant of a Wellington squadron is responsible for the scheme which, though only three weeks old, is proving a popular innovation among the flying men. Before coming to Britain he tried it out with considerable success in the Middle East.

Briefly, his idea is that these young men, many of whom have come into the Air Force with little or no experience of commercial life, should, as far as facilities will allow, acquire all the knowledge they can of routine jobs and the responsibilities they carry.

Deep in the Forest

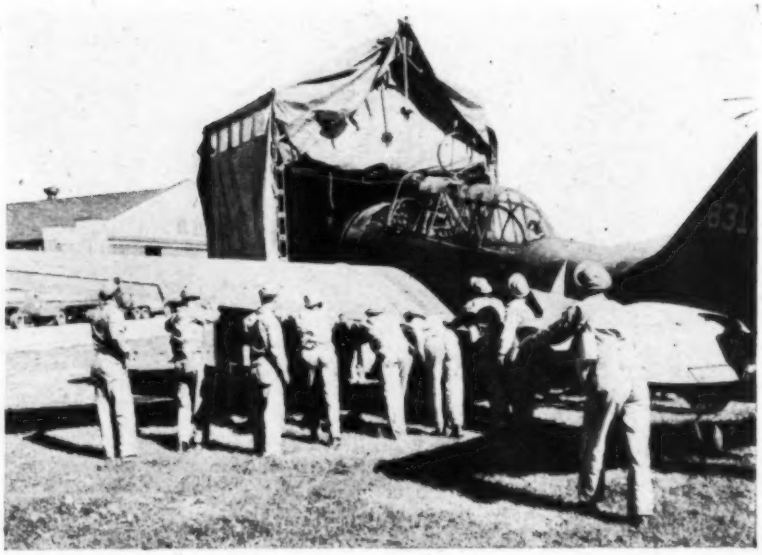
FROM an airfield in the heart of a forest a Coastal Command squadron is playing its part in the Battle of the Bay—the British challenge to the U-boat in the Bay of Biscay.

Daily over the tree-tops soar long-range bombers which slip over the coast to search for submarines. Then they return, like mighty birds of prey, to their roosts among the trees—but not in them!

In creating the airfield few of the natural characteristics of the area were disturbed. A vast clearing was used for the runways, which will comfortably accommodate the biggest aircraft, but practically everything else on the station was built under cover of the trees, hardly any of which were cut down.

In building the officers' mess, for example, in order to obviate the destruction of a stately pine tree a hole was cut in the roof to fit the shape of the tree.

The result is artistic—and excellent camouflage.



TENT ON WHEELS: Students in the U.S. Air Service Command at the Selfridge Field Training School, Michigan, pushing the nose of a North American O-47 observation aircraft into a portable nose-hangar used on active service. The hangar is mounted on wheels.

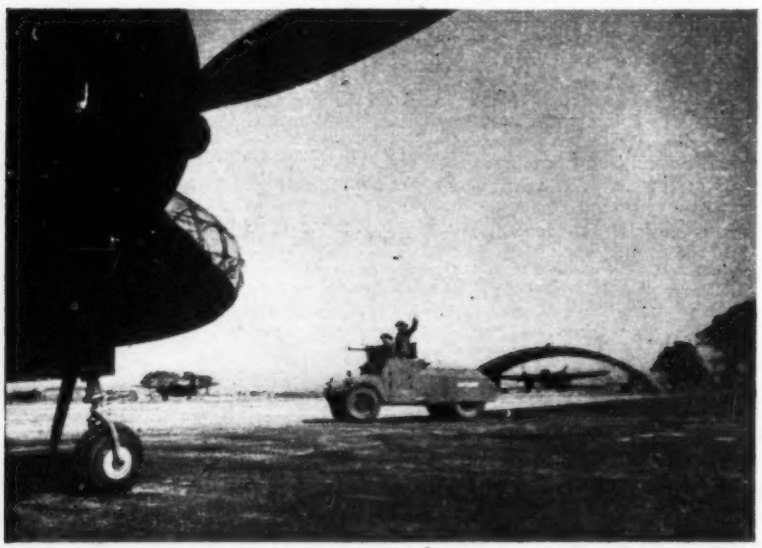
Canadian Paratroop Badges

OFFICIAL authorisation of badges for the Canadian Parachute Corps was recently announced by the Department of National Defence.

The cap badge consists of an open parachute between two wings. At the junction of the shroud lines are five maple leaves, and the whole rests on a scroll inscribed "Canadian Parachute Corps."

The collar badge is a hand grasping a short sword, extending downward from a cloud which is inscribed *ex coelis* (from the sky). The buttons are decorated with a parachute with a single maple leaf at the junction of the shroud lines with the word "Canada" around the rim of the button.

Badges and buttons for officers are to be finished in gilt, and those for other ranks in brass.



ON GUARD: An armoured reconnaissance unit of the R.A.F. Regiment on a patrol of the airfield for whose safety it is responsible. Note the blister hangar in the background. The Bostons are obvious, but amateur spotters can try their skill on the aircraft under the blister!

Aircraft Production for January

THE first instalment of a detailed production article on the Avro Lancaster is a particularly interesting feature in the January issue of our associate journal, *Aircraft Production*, which is now on sale.

Another special feature of this number is the description of the Junkers *takt* line assembly methods now universally adopted by the German aircraft industry, while other items include German data comparing copper and light alloy conductors for electrical wiring systems, a survey of modern spot-welding practice in aircraft factories, and a useful article on the forming of aircraft parts by the drop-stamping process.

Heard These?

JOKES inspired by the shortage of rubber and the need for conserving tyres are very topical in America these days.

Thus, when one Yankee was telling another, recently, how Mr. Roosevelt's car had a guard of eight motor-cycle policemen when he was making an official visit to a big aircraft plant, the comment was: "Gee, two to each tyre, huh?"

* * *

THE Nazis claim, it is said, that their *Luftwaffe* pilots are descended from the Gods.

The R.A.F., of course, help them to trace their descent in a direct line!

DEBATE ON CIVIL AVIATION

"Do Something Now" the Main Theme

IF anything definitely encouraging emerged from the recent debate in the House of Commons on civil aviation, it was that Parliament, as a whole, not only realises the vital importance of commercial air transport as a keystone in post-war reconstruction, but appreciates also the need to plan in advance. Editorial comment will be found on pages 703 and 704.

As Captain Harold Balfour, Joint Under-Secretary of State for Air, remarked when replying for the Government, "The theme running through this debate has been 'Do something now.' There is a universal acceptance of the importance of air transport for our national future. There is no question about that, and the Government realise that as much as honourable members who initiated this debate."

Plain Speaking

It was Mr. Perkins, the Member for Stroud, who opened the debate and he did so without mincing matters when it came to voicing his opinions on the attitude of the Air Council towards civil flying, in which, he said, they had never been interested. Moreover, he did not think they ever would be. He also crossed swords with the Paymaster-General who, he said, had his sympathy at being "suddenly pitchforked into this civil aviation arena," but who, for some reason, was finding it difficult to come to certain conclusions. Until certain questions of policy, raised by the Inter-Departmental Committee eleven months ago, had been settled, this committee could not go on functioning usefully and he urged the Minister, with all the power he had, to come to some conclusions now, because while he was considering the matter—"if he is"—Pan-American Airways were stretching their tentacles all over the world.

"I am not antagonistic in any way to the great American nation," added Mr. Perkins, "I believe it is vital that in future we should co-operate with the Americans in air transport, and I foresee that unless we do as soon as the armistice comes, there will be a race between the Americans and ourselves to control the airlines of the world.

A Mixed Lot

"We shall have practically no aeroplanes to compete, except those loaned to us under Lease-Lend, and if we try to run airlines with those loaned to us by the Americans, friction is inevitable."

On the production side he said that British Overseas Airways were using a mixed assortment of aircraft consisting "partly of old crocks, five, six, seven years old, many of them ripe for the scrap heap; partly of R.A.F. throw-outs, crumbs from the rich man's table, machines which the R.A.F. do not want, and partly, owing to the generosity of our American friends, some modern American machines." It must be obvious to anyone how utterly impossible it was to run an air-line with this mixed assortment of machines and engines.

His quarrel with the Minister of Aircraft Production was that there were no plans or designs in hand for civil aircraft. He knew that the Government would ask him if he had not heard of the York, but that was not designed as a civil machine; it was designed as a bomber and then converted to use with the Army. He was aware that it was an ideal machine for civil airways, but not a single one had yet been made available for British air transport.

Mr. Perkins said he believed that we could partly retrieve the position if we took action now, and he suggested that the Air Council should release 30 aircraft at once—20 Yorks and ten Sunderlands—because he did not believe that this would really have any effect whatever on our attacks on Germany.

On the question of long-term policy, Mr. Perkins advocated taking civil aviation away from the Air Ministry and handing it over to some other department, and added that not only air-liners, but gliding, light aeroplane clubs and private flying should also be considered.

Group Captain Wright (Erdington Division of Birmingham) followed Mr. Perkins, and said that he had spoken so often on the subject that he found it difficult to add very much to the case he had put forward on so many occasions in the past. Nor did he feel that much was to be gained by going back and worrying about mistakes of the past, mistakes which to-day were so clear and obvious.

The greatest mistake of all, he went on, was the failure on the part of the Air Ministry, in spite of what was said in the House over and over again, to envisage that, when the war broke out, the right policy was not to shut down civil aviation but to develop and encourage it, because it would be such a very necessary ancillary part of the war machine. As a result of the failure to envisage that, this country was almost entirely lacking in suitable transport machines to-day.

Prophecy Come True

"There is undoubtedly, at long last, a great wakening of interest in aviation throughout the country," added Grp. Capt. Wright. "This interest has been aroused largely because the aeroplane has proved itself to be the dominant factor in the successful prosecution of modern war. This was, of course, prophesied by many of us in those happier years when, on the floor of the House, we fought at regular intervals what was known as 'the battle of the Admirals.' In the same way to-day we prophesy that the aeroplane will also prove to be the dominant factor in the successful prosecution of the peace."

He whole-heartedly agreed with Mr. Perkins that the whole future of the great British Commonwealth might well depend on how they handled this matter. Obviously, the whole future of civil aviation, as of so many other features of reconstruction, must depend on the degree of co-operation or otherwise which existed among the nations when hostilities ceased. If we continued to co-operate in the way we were now doing so successfully to prosecute the war, then, indeed, the future of civil aviation could be dealt with successfully and the future would be bright.

There were, he added, a number of things that could be done now, and he envisaged, among other post-war aspects of co-operation, a free use of the air above each other's countries, and a free use of airports. There would be problems to solve, of course, but if they were left until the end of hostilities they would never be solved, and we should return to a state of chaotic confusion in which there could be no properly planned co-operation.

Producing Internationally

The possibility of pooling designs and developments and of designing machines internationally, of producing them internationally by a fair sharing out of the great industry which would spring up, and of placing orders under some regular system instead of competing under price tenders, were some of the possibilities which he thought should be receiving attention at the present time so that we might be ready to meet each and any of the situations that would arise.

Grp. Capt. Wright also referred to "the condition of the British Overseas Airways Corporation," which, he said, was effectively raised by Mrs. Tate (Frome) when the House went into committee on the Air Estimates a few months ago. He did not want to reiterate the obvious failings which were quite clearly stated at that time, but he wanted

DEBATE ON CIVIL AVIATION

to point out that, even as a result of those disclosures, nothing whatever had been done in the meantime.

"The corporation is seething with discontent inside," said the Group Captain. "This is well known. I think the fact is actually admitted even by those in control, but it is most regrettable that the directors will not face the situation and will not stand up, if it is necessary, even to my right honourable and gallant friend at the Air Ministry. It is something which should, and can, be dealt with, and there is no excuse for not dealing with it."

No Time to Lose

The next speaker was Sir Lindsay Everard (Melton), who supported the contention that action was now necessary. "There is no doubt," he said, "that we have arrived at the moment when something must be done to speed up aviation after the war,

"It is no use trying to run a first-class Empire with third-class aviation," he added, "otherwise we shall court disaster, and we shall deserve it."

It was not generally understood, he said, that, although aviation itself meant speed, there was probably nothing that took longer than the preparations for aviation.

You could put social reforms into operation in a few months, but it took several years before you could get a new design of aircraft into the air, arrange landing grounds properly, and all the other things that were necessary.

Sir Lindsay reminded the House that when he had spoken on the subject in the past he had expressed the opinion that civil aviation should be left under the Air Ministry, but he qualified that by saying that we should have a separate Minister of Civil Aviation. Unless we did, we should never make any headway because the Under Secretary had far too much to do with the military side to be able to undertake this job as well. If we could not have a separate Minister of Civil Aviation, then he was in favour of civil aviation being taken away from the Air Ministry altogether. It had had a very poor deal from them in the past, and it did not look as though it would fare much better in the future, and we could not afford that; the issues were too important.

Sir Lindsay also advocated the "open-sky" policy; and, remarking that we now had the governments of nearly all the free nations with us in London, it was a good time to call them together to discuss the matter.

The importance of the Empire services and the trans-atlantic routes was also stressed by this speaker, who went on to put in a strong plea for the flying clubs, which, he said, had done most of the training outside the R.A.F., and had rendered valuable service to their country.

After Lt. Col. Elliot (Kelvingrove, Glasgow) had stressed the need for the planning of airports and air harbours as well as aircraft, and Mr. Montague (Islington, West) had raised the question of the use of air transport in the war, Mrs. Tate arose to express regret that "the Under-Secretary of State for Air did not find himself able to sit with us and go without his meal until a later hour" considering the very short time they had had to consider this subject.

Capt. Balfour thereupon interrupted the honourable lady to say that he had not had a meal, to which Mrs. Tate replied that whatever he had been doing—and she was glad he had not had his meal—it was a very great pity he did not find himself able to sit there during the whole course of the very short debate. Unless the matter were treated with the seriousness it deserved we should find ourselves winning the war and losing the peace. She then dealt mainly with the question of ground personnel needed by civil aviation in the reconstruction, and with the fact that all modern transport aircraft were being manufactured in America, which she thought was a very great mistake.

When Mr. A. Edwards (Middlesbrough, East) had sharply criticised a recent financial deal by a leading firm of aircraft manufacturers which, he alleged, involved the provision of £750,000 of public money "for a fictitious transaction," Capt. Balfour rose to reply for the Government, saying that he could not, in the limited time at his disposal, reply to all the points that had been raised.

First Things First

On the main issue, however, he defended the Government by saying that during the war, the extent of their support to civil aviation had had to be measured by its contribution to the war effort.

"We have had to concentrate upon first things first," he said, "and our first need has been to build up an air force to beat the *Luftwaffe* wherever it may be met. It is worth remembering that we started this war with a big leeway in first-line strength and the balance has had to be struck as regards the conflicting calls upon our limited resources."

Saying that they must look at post-war civil aviation in a big way, Capt. Balfour agreed that it was one of the major tasks of national reconstruction; the Government wanted to go ahead wherever possible, but there were reasons (which he outlined) why we must look to the U.S. for the bulk of our transport demands for the war years.

LISBON'S NEW AIRPORT

EUROPEAN TERMINUS. This is the first panoramic view to be published of the new airport described in *Flight*, Nov. 5th, which was opened last October and which stands on a small plateau to the north of Lisbon. It was a British Overseas Airways machine which effected a symbolic inauguration by landing there with Mr. John Balfour, British Minister to Portugal, on Oct. 15th.

B.W.P

AIRCRAFT CONTROLS

—OF COURSE!

Twenty-ninth of the New Recognition Series

AIRCRAFT TYPES AND H

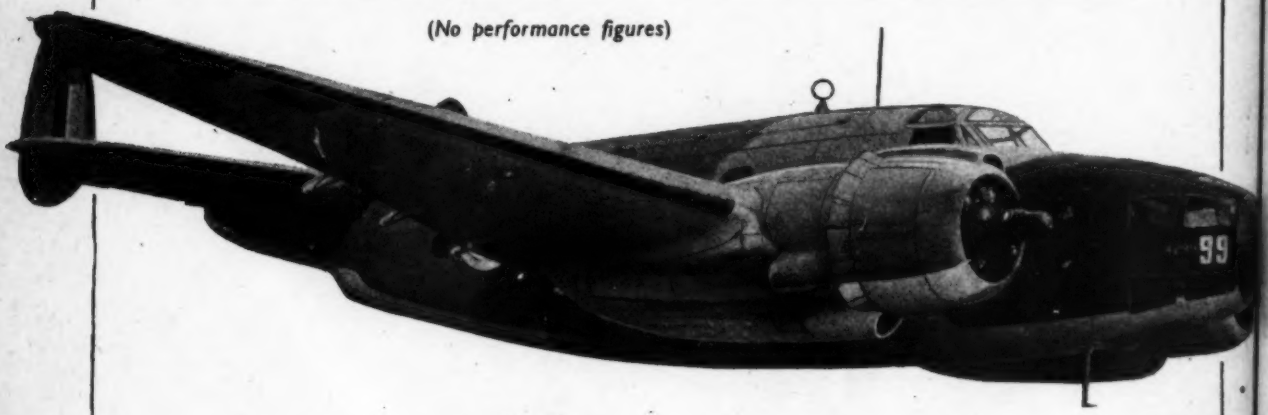
LOCKHEED VENTURA

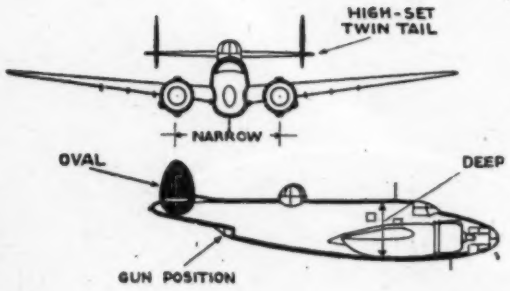
ALTHOUGH the Lockheed-Vega Ventura has been in operational service with the R.A.F. for some little time, it was only on the recent occasion of the daylight raid on the Philips radio factory at Eindhoven, some 60 miles inside Holland, that this type was officially mentioned for the first time. This is the usual procedure in dealing with the release of information about new types of aircraft in operational service with the R.A.F. and the Fleet Air Arm; not until it is certain that an example of the type has fallen into enemy hands in sufficiently good condition for them to be able to examine it thoroughly, and assess its probable capabilities, do the authorities permit any mention of its existence, and even then very little actual data may be published despite the fact that the Germans must quite obviously know very nearly all there is to know about it, except, perhaps, its actual speed and other important performance figures. To ascertain these, they must repair the damaged captive and fly it themselves, a process which takes time. So it would obviously save them valuable time if such data were presented to them gratis.

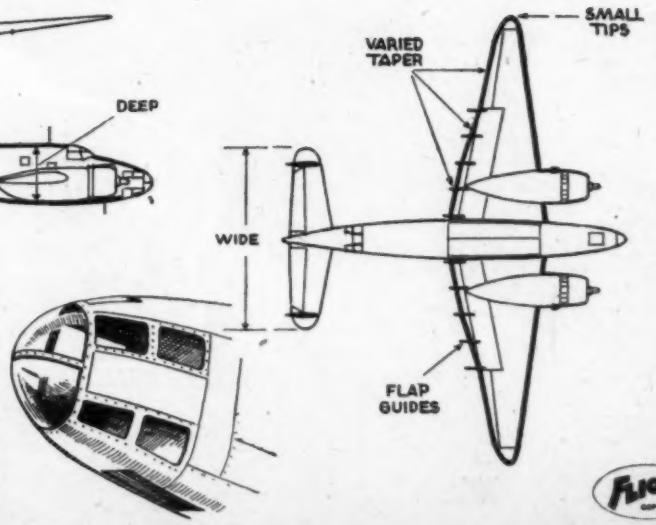
Thus it is only possible to make the briefest of statements here on the characteristics of the Ventura, which is a development of the Lockheed Lodestar air liner in exactly the same way as its predecessor, the Hudson, was a military version of the commercial Lockheed "14." Structurally, the Ventura and the Lodestar are very similar, but the military development has a fuselage some 7ft. 6in. longer and is powered by more powerful engines, namely, two Pratt and Whitney 18-cylinder Twin-Wasps, each of 2,000 h.p. Its armament may not be described in detail, but it includes a pair of machine guns in the upper turret and two more firing downwards and to the rear from a gun position at the back of the bomb bay.

Very similar in general appearance to the Hudson, the Ventura may be distinguished from the older type by the under gun position, which is fairly close to the tail, and by the fact that the dorsal turret is appreciably farther forward than that of the Hudson. The two machines have the same span and wing form and their twin tail units and nose contours are to all intents and purposes identical. Needless to say, no performance figures may yet be given, but obviously they show a useful improvement on those of the Hudson.

(No performance figures)





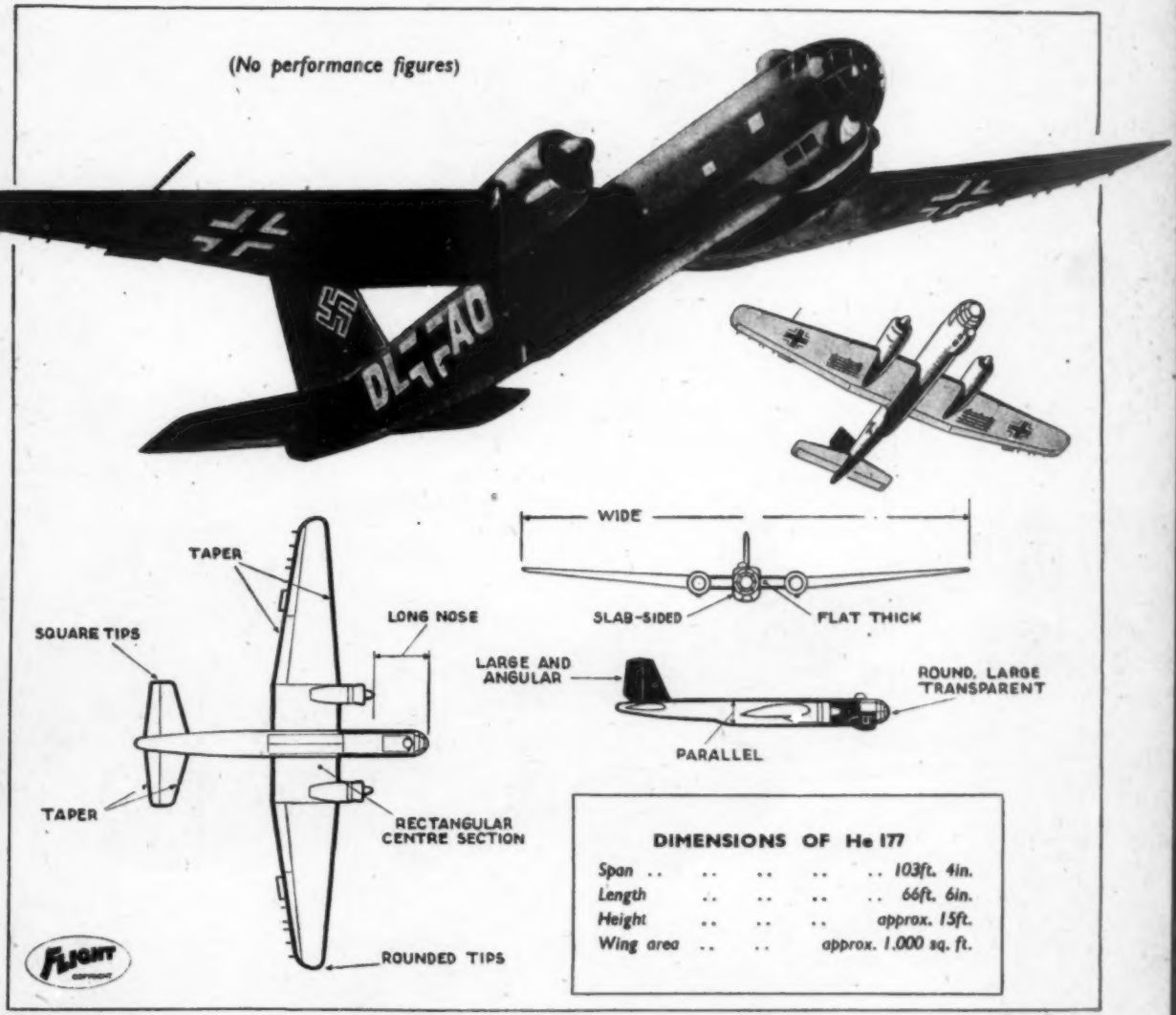


DIMENSIONS OF VENTURA

Span	65ft. 6in.
Length	57ft. 6in.
Tailplane span	25ft. 10in.
Wing area	551 sq. ft.

D HEIR CHARACTERISTICS

HEINKEL He 177



DIMENSIONS OF He 177

Span	*103ft. 4in.*
Length	*66ft. 6in.*
Height	*approx. 15ft.*
Wing area	*approx. 1,000 sq. ft.*

REPORTS of occasional high-flying visits to this country by isolated examples of Germany's new heavy bomber, the Heinkel He 177, have done little or nothing to augment the very scanty amount of data so far gleaned about this machine; up to now its pilots, doubtless acting on instructions, have taken care to keep well out of reach of our fighters and our anti-aircraft guns, so the opportunity to examine even the remains of one has (so far as is known to the contrary) not yet presented itself. From its external proportions, however, it should be capable of carrying either a very substantial bomb-load at what may be termed normal high altitudes, or a proportionally smaller bomb-load at "sub-stratosphere" levels. It is generally believed to have been designed with the latter object in view, since the costly business of attempting raids on this country would appear to be one the enemy is not now in a position to afford.

Any tentative performance figures which may have been put forward must obviously be a mere guess and therefore of no help to the R.O.C. plotter or A.A. gunner, and, apart from the self-evident fact that it has a gun-turret of some kind (probably power-operated) immediately behind and above the pilot's office, and a blister beneath its nose which looks capable of accommodating further armament, nothing is known definitely about its powers of self-defence in the matter of guns and armour.

It is, however, an easy machine to recognise, with its long, slab-sided fuselage, rounded transparent nose, and large angular single fin and rudder.

Its span is slightly greater than that of our Lancaster, the wings comprising a flat, rectangular centre-section of considerable thickness, at the extremities of which are mounted the two massive engine-nacelles. These nacelles were each believed, at first, to house two power-units, but it is now generally accepted that the power is supplied by a pair of 2,200 h.p. Mercedes-Benz DB 606 "double engines"—one in each nacelle—which might well be "X" type units. Circular radiators on the nose of the nacelles give the outward appearance of very large radial engines after the manner of the Ju 88.

The
LANCASTER
AVRO
A. V. ROE & CO. LIMITED

SOME HIGH SPOTS OF 1942

A Technical Survey of Progress Made During the Past Year

By W. NICHOLS, A.R.Ae.S.

WITH the progress of the war the design of aircraft and equipment advances rapidly, and it is unfortunate, but, nevertheless, essential, that so many valuable and interesting data must be withheld until the final victory has been secured. In our pessimistic moments we are apt to ask ourselves: Are the Air Ministry long-term strategists and our aircraft and engine designers accurately foreseeing the aerial and military needs for 1944 and 1945? Can our designers keep ahead of our rivals? A glance at what has been achieved during the past year is reassuring. For example, our heavy bombers, the Stirling, Manchester, Halifax and Lancaster, were, in fact, visualised some six years ago, and the first Hurricane flew in 1934. The Spitfire is in essentials even older if one takes into account its Schneider Trophy ancestry.

This review emphasises that these aircraft in their latest details, devices and equipment, automatically brought about in the light of experience as the war proceeds, are ahead of anything the Axis has produced so far, proving the soundness of policy and foresight of the Air Ministry in co-operation with the British aircraft industry.

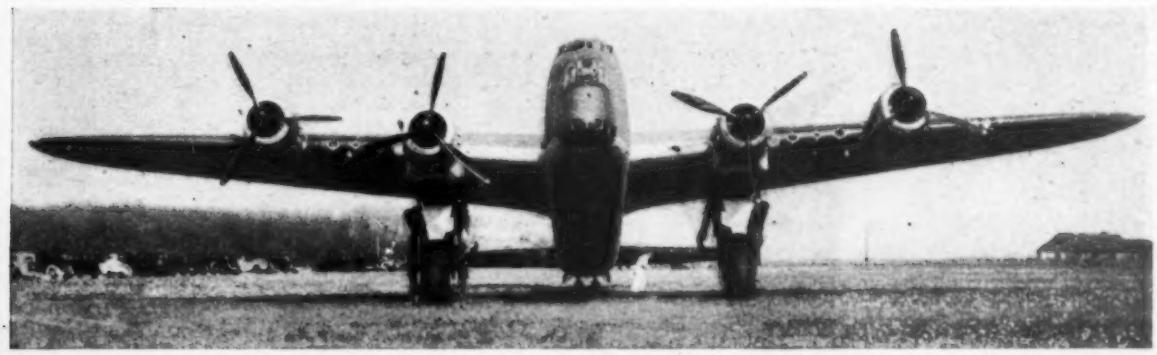
For this reason perhaps we have not during the past year been overwhelmed with new designs, as such, in the Services. Amongst the more important new British types described by *Flight* during the year are the Avro Lancaster, Handley Page Halifax and Short Stirling heavy bombers; the Westland Whirlwind, designed as a day and night fighter, and more recently in use as a fighter-bomber; and the De Havilland Mosquito reconnaissance bomber, which has figured in many raids during the latter part of the year. In all these aircraft, aerodynamic cleanness is an outstanding feature of their design. All carry heavy loads over long distances at high speed. The Mosquito bears a considerable resemblance to the De Havilland Comet which won the England-Australia race of 1934, and, apart from such changes in outline and arrangement as are necessary for its function with the Service, it may be regarded as a scaled-up development of the Comet.

Racing Influence

The Mosquito is chiefly of wood construction, and the form is such that it makes possible a very wide dispersal of manufacture, not only at home but overseas, and it has already been announced that this aircraft is also being manufactured in Canada. This is the first modern operational type of aircraft to embody this type of construction.

The Westland Whirlwind is powered by two underslung 860 h.p. Rolls-Royce Peregrine engines, the radiators for which are totally enclosed in the wing, duct cooling being employed. Frontal area of the Whirlwind has been reduced to an absolute minimum. The Peregrine engine as employed in the Whirlwind is fully supercharged.

The Avro Lancaster is the latest of our four-engined bombers, and has been used very effectively over enemy territory. Features of this bomber include the nose, tail and dorsal gun turrets on the lines of its giant sisters, the



TWO "HEAVIES" OF 1942: The upper photograph shows the Short Stirling, which is powered by four Bristol Hercules sleeve-valve radial air-cooled engines. In the same class is the Handley Page Halifax (lower picture), which has four Rolls-Royce Merlin liquid-cooled engines.

THIRD AND FASTEST OF THE TRIO : The Avro Lancaster is in the same class as the Stirling and Halifax, and, like the latter, has four Merlin engines.

SOME HIGH SPOTS OF 1942

Stirling and Halifax, but its speed and range, together with its huge bomb load, are other characteristics which make this latest addition so effective.

In November *Flight* referred to an improved Vickers-Supermarine Spitfire now in operational use, equipped with the Rolls-Royce Merlin 61 engine instead of the Merlin 45 or 46, the two airframes being almost identical, but the nose of the improved version being slightly longer to take the bigger engine. Another difference is to be seen in the wings, both of which in the improved type have underslung radiators, the port side radiator being associated with the engine intercooler for the two-stage supercharged Merlin 61. A four-bladed airscrew provides the greater blade area necessary to absorb the power output at the greater altitude.

The recent considerable astonishment caused in aeronautical circles (more especially in Germany) when three of the new German Junkers 86P high-altitude aircraft were brought down by British pilots over the Egyptian area is due, it is logical to assume, to our men flying in the new improved Spitfire with the Merlin 61 engine.

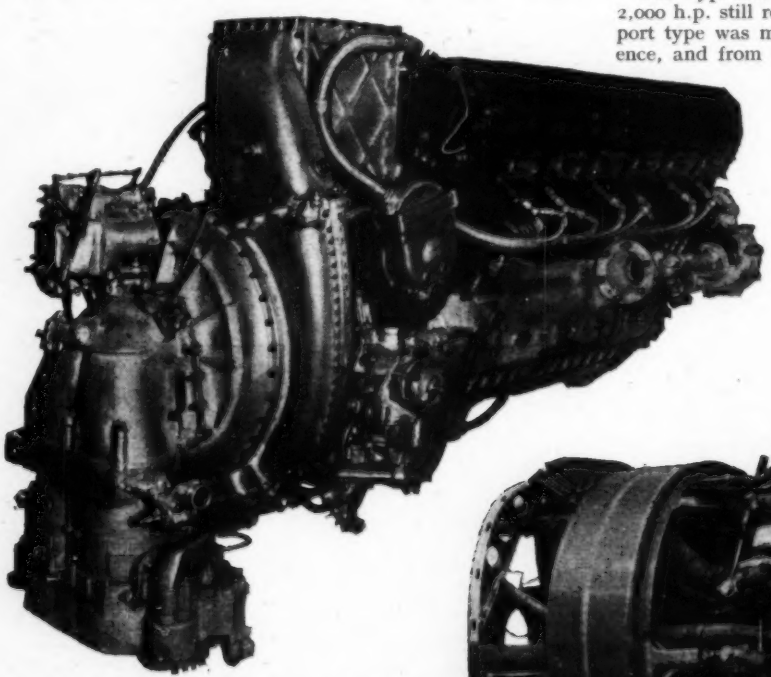
Deck-landing Fighters

The Seafire, the latest naval fighter, is a conversion of the Spitfire, and in August the Germans reported Spitfires being used to protect our convoys to Russia. It is probable that these deck-landing Spitfires were of this type.

Quite recently mention has been made of the Bristol Bisley, a close-support Army Co-operation machine equipped with two Bristol Mercury engines, and as such is the latest development of the Bristol Blenheim.

The Typhoon fighter with Napier Sabre engine of about 2,000 h.p. still remains on the secret list. The York transport type was mentioned in Parliament as being in existence, and from what has been written it is obvious how our latest aircraft have been developed from those sound and efficient designs laid down some years previously, when obviously the Air Ministry and the aircraft industry planned with meticulous care and foresight provisions for the future requirements in the Service, without having completely to redesign and reorganise production to keep ahead of the enemy in design and performance.

Very few data have been published during the year in connection with British aircraft engine development. A full description of the Merlin XX appeared in *Flight* dated February



BRITISH AND GERMAN "HIGH SPOTS" OF 1942 : Above, the Merlin 61, with two-stage two-speed supercharger. On the right the BMW 801 14-cylinder twin-row radial. The rated power of the German engine is obtained at 16,000ft. The Merlin takes a Spitfire above 40,000ft.

26th, 1942, when this engine was correctly described as a British masterpiece.

The latest type of which certain details have been released is the Merlin 61. The basic design still remains, though naturally innumerable detail improvements have been effected.

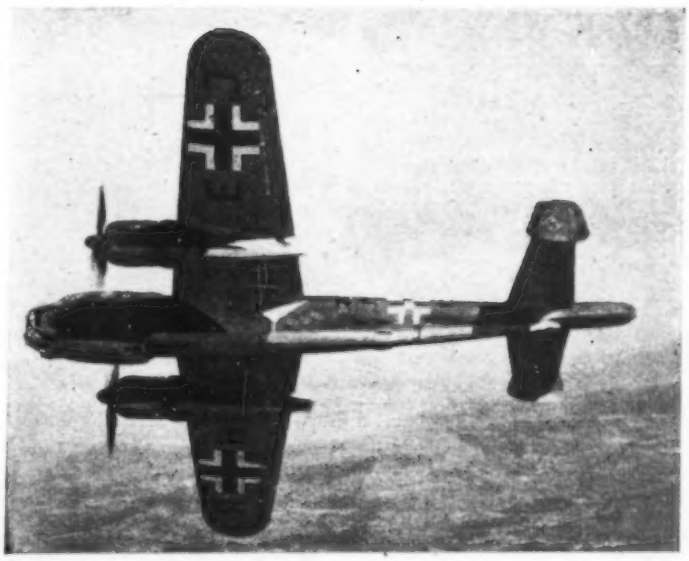
Progress in the design of superchargers is primarily responsible for the magnificent performance of the Merlin 61 at high altitudes. British technical achievement in this connection has been far superior to that of the enemy, and Rolls-Royce engineers have not only earned distinction but made history by the introduction into Service types of the first proved two-stage, two-speed supercharger on the Merlin 61.

Mention was also made during the year of the Napier-Halford Sabre sleeve-valve engine, but no details may be published beyond the fact that the engine is in the 2,000 h.p. class. That much will be heard of it during the coming year there can be little doubt.

It has so happened that no new radial aircraft engines have been announced. That is not by any means to be taken as a proof that the radial is dying out. Far from it. The engines of the Bristol Aeroplane Co., Ltd., notably the Hercules sleeve-valve engine, have continued to do good work during the past year, and it is scarcely to be thought that this marks the limits of the Bristol range. *Flight* expects to have the privilege of recording important developments in 1943.

Airscrew development has also gone ahead in the past year with the fully feathering and contra-rotating types, both electrically and hydraulically controlled, and a further interesting feature of wood blade manufacture recently revealed is the Hydulignum process described in *Flight*, November 26th, 1942.

Of the excellent American aircraft in service with the R.A.F. during the past year which have received frequent mention is the Army Co-operation Mustang, a fighter design which merits close study and embodies many interesting features. Powered with the Allison 1,150 h.p. engine with single-stage blower, it is eminently suited for Army Co-operation duties.



WHICH WOULD YOU RATHER HAVE?: An interesting comparison between the De Havilland Mosquito and the Dornier 217 E. The two are of comparable size, but the German machine has a wing loading of 55 lb. per sq. ft.

Twin-engined Fighters

Another American fighter is the Lockheed Lightning. This came into service with the R.A.F. during the past year, and the top speed with service equipment has been quoted at 380 m.p.h. at 16,000ft. A two-seater Lightning is being delivered to the U.S. Army Air Forces, and a similar version is to be produced for the R.A.F. The Lightning is equipped with two Allison engines, 12-cylinder V-type liquid cooled, of 1,150 h.p., and fitted with exhaust-driven turbo-superchargers.

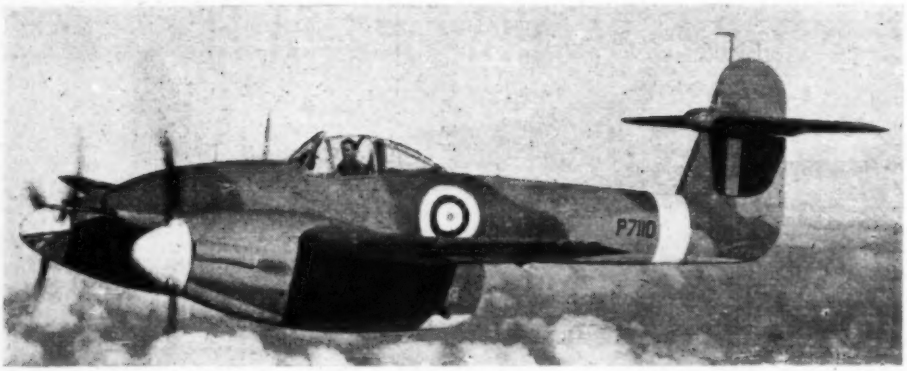
Other types that have been described as fully as possible in *Flight* during the past year are the Douglas Boston III; the North American Mitchell B.25 C; the Curtiss Warhawk; the Republic Thunderbolt, and more recently the Lockheed Ventura.

Probably the most interesting of the German aircraft to fall into our hands during 1942 have been the Focke-Wulf Fw 190 single-seater fighter with the BMW801D radial engine and the Dornier 217E bomber, dive-bomber, minelayer and torpedo aircraft, also equipped with two BMW801 radials.

The Focke-Wulf 190/A3 is the *Luftwaffe's* latest and much-advertised fighter. A notable feature of this aircraft is the compact arrangement of the twin-row radial engine. The Fw 190 is a cleverly conceived and well-produced machine embodying a number of improved features, and it probably provided an important addition to the equipment of the enemy, but even so it is very far from being the equal of the latest efforts from British designers in actual combat.

Two most interesting features of the Dornier 217E, apart from the BMW801 engines, is the grouping of the entire crew in the fuselage nose and the "umbrella" type diving brake in the tail. The estimated maximum loaded weight of this aircraft is 33,500 lb., and the wing loading reaches the astonishingly high figure of 55 lb./sq. ft. The take-off run must, under such circumstances, be exceptionally long, and when loaded to its limit the Do 217E needs some form of assisted take-off. A nose hook and a tail support on captured specimens appear to confirm this view. The diving brake or drogue is of special interest and is readily detachable when the aircraft is not being used for dive-bombing. The operation of the drogue is simple in principle, the rotation of a threaded shaft causing a nut to travel along, and in so doing it tilts the "umbrella ribs" on which are mounted the four blades of the air brake.

Considerable attention has been given recently to the value of transport aircraft, and in our issue of December



FIGHTER AND BOMBER: The Westland Whirlwind (two R.-R. Peregrines) has been used as a day fighter, night fighter and fighter-bomber.

SOME HIGH SPOTS OF 1942

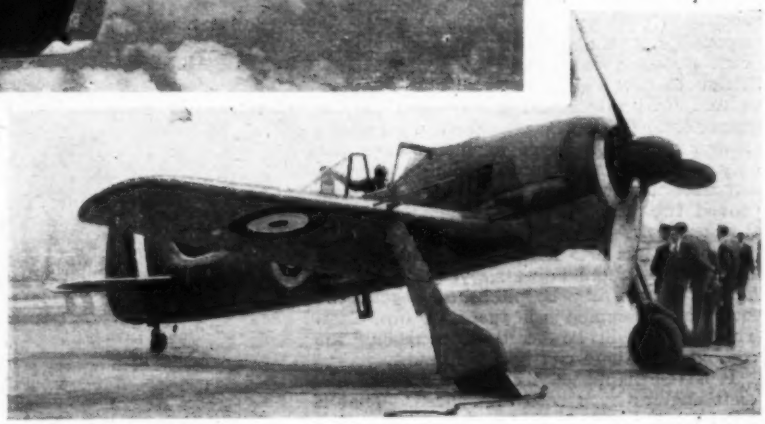
10th, 1942, appeared a copyright drawing of the enemy's latest transport, the Blohm and Voss BV 222 six-engined flying boat. It is thought that only a few of them exist, and information filtering through to this country so far is conflicting. Apparently the span is approximately 150ft. and length about 120ft. The engines are six BMW 132 DCs of 1,000 h.p. each.

A German Radial

Probably the best example of enemy progress in aircraft engine design is the BMW 801A two-row radial, giving, at 2,700 r.p.m., 1,580 b.h.p. for take-off, and the maximum emergency power being 1,585 b.h.p. at 15,750ft. International rating is 1,460 b.h.p. at 16,300ft. This unit is employed on the Focke-Wulf 190 and Dornier 217E machines. The engine is of outstanding interest, very compact, and a feature is the cooling fan at the front end, driven off the airscrew reduction gear, an adequate airflow thus being assured.

On the subject of aircraft armament much might be written. An article on fighter armament published in *Flight* of November 12th, 19th and 26th called attention to a subject about which little had previously been published. It dealt with the evolution and history of aircraft guns and cannon, outlined the different schools of thought followed by various nations, and forecast likely future developments. So far as the year 1943 is concerned, the main tendency has been towards heavier armament, particularly of fighters, in which there are several examples of cannon having supplanted machine guns. The concentrated weight of fire thereby obtained would have been deemed impossible a few years ago. Yet it has been achieved without major modification of the aircraft.

Aircraft technicians of the Allies, and Britain in particular, are more than holding their own against the skill and enterprise of the enemy, and the latest developments promise well for the future progress of the war.



FOR MEDIUM AND HIGH-ALTITUDE OPERATION: The Focke-Wulf Fw 190 (BMW 801 engine) was Germany's outstanding fighter of 1942. Ours was the Spitfire IX with Rolls-Royce Merlin 61 engine. The latter combination reaches a height of nearly 50,000ft.

GAS TURBINES AND JET PROPULSION

A New "Flight" Handbook

SUSTAINED flight by jet-propelled aircraft is no longer the dream of inventors, and leading nations of the world are actively interested in the development of this new phase of aviation. Hitherto no work of reference on the subject of aircraft propulsion plants employing combustion gas turbine and compressor combinations has been available to the general public.

Flight first recognised the importance of this subject and published a series of articles by its Managing Editor, G. Geoffrey Smith, M.B.E., on thermal jet propulsion systems with rotary, reciprocating, or combined units, in which were surveyed also steam and gas turbines driving airscrews. In response to many requests these articles have now been reprinted in their entirety, together with amendments and additions, in a new illustrated handbook under the title of "Gas Turbines and Jet Propulsion for Aircraft." The price is 3s. 6d., or 3s. 9d. post free, and copies can be obtained from *Flight*, Dorset House, Stamford Street, London, S.E.1.

The Bristol Engine School for the R.A.F. Situated in the West Country it was a school of industry in peacetime. It is now a hive of industry.

THE BRISTOL ENGINE SCHOOL

Training R.A.F. Personnel in Care, Maintenance and Running of Bristol Engines

THIS article on the Bristol Engine School is complementary to the description of their Airframe School published in our issue of December 24th. Another Bristol school, where senior engineering, student apprentice and trade apprentice courses are held, was described in the October 8th issue of "Flight".

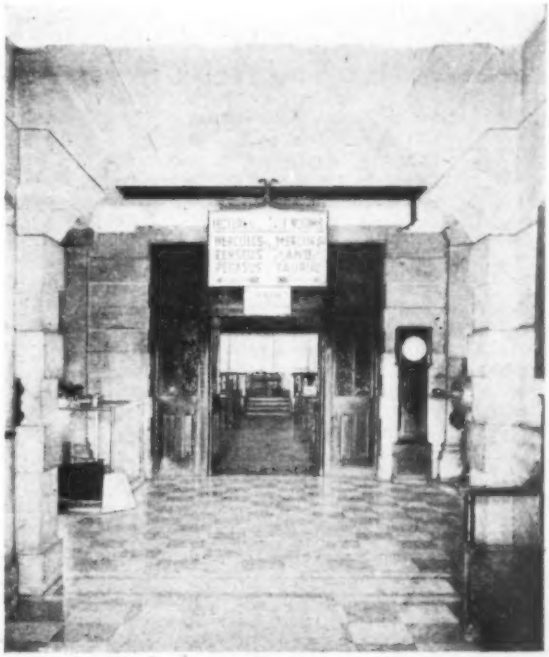
MODERN aircraft engines are designed to give greater power from less fuel, and so their control becomes more complex. It is essential that R.A.F. men working on them at airfields should have a full knowledge of their construction, and it is difficult to obtain that knowledge within the Service. Only the manufacturers' technicians can fully understand how to get everything out of the engines that the scientist-designers have planned, and then only after years of study.

The problem was how to pass enough of that knowledge on to the R.A.F., which is expanding so rapidly and must therefore necessarily train its crews at high speed, in such a way as to make certain that none of the value of modern engines was lost. The makers of the engines, and in particular the Bristol Aeroplane Company, came forward with an idea of their own. They arranged that ground crews from R.A.F. airfields should attend a course on aircraft engines. For this purpose they created a special school and compiled an intensive course.

Master Carburettor Control

Airmen who are sent on this course receive practical instruction in the type of Bristol engine on which they are working in the Service. They start by seeing the engine reduced to its many component parts. They receive lectures on these parts, and then assemble the engine until it is ready for running. Experts show how to treat the engine to produce the best results, and demonstrate why a slight mishandling of the controls, or lack of knowledge of one small point, may produce inefficiency, wastage or serious loss.

Flight was recently privileged by the Air Ministry to visit the Bristol Aeroplane Co., Ltd., R.A.F. Engine Training School. This establishment was originally a school of a very different character, which was requisitioned by the Air Officer Commanding-in-Chief, Technical Training Command, to be used for this purpose. The establishment is completely self-contained and provides spacious exhibit rooms, lecture rooms and workshops, complete facilities for messing and accommodating airmen, and large, airy, comfortable dormitories. A spacious two-storey building is

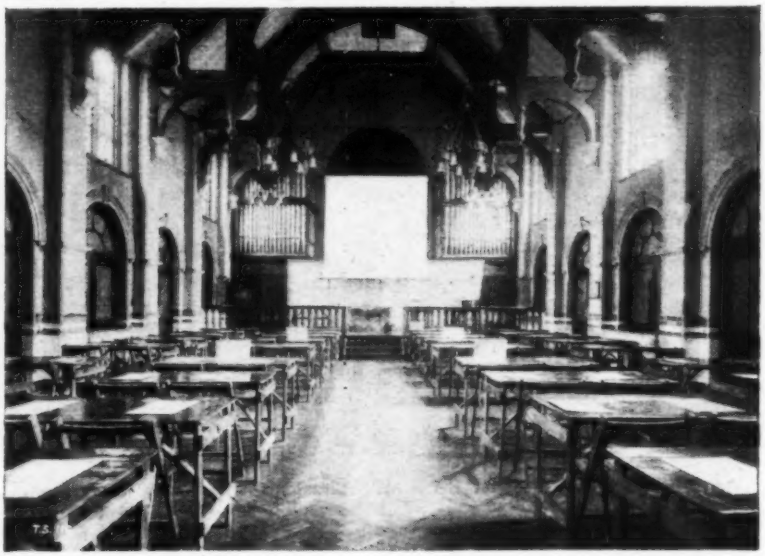


In the vestibule. Direction boards indicate where the lecture rooms and classrooms are.

THE BRISTOL ENGINE SCHOOL

equipped for recreation purposes. A large building directly attached has been equipped as an Officers' Mess.

The school is one of many dealing with various subjects under the direction of an Administrative Officer, Manufacturers' Courses, Technical Training Command, R.A.F. The Chief Instructor at the B.A.C. School is Mr. J. H. B. Wheeler-Kither, who has the combined qualifications of being trained in service routine with the Royal Navy in the past, in addition to being an expert on Bristol aircraft engines. Consequently Mr. Wheeler-Kither is especially qualified to take charge of both the disciplinary and technical welfare of the personnel under his instruction.



The original school hall is now the main lecture room. Examinations are held here at the end of each course.

Well Established

This particular school has been in operation since April, 1941, and the scheme itself since 1939. The main reasons for Manufacturers' Courses was in this case due to constant development necessitating modification to existing aircraft engines. Under such conditions the manufacturers could provide the ideal course of instruction. Moreover, the psychological effect of the airmen being able to visit the factory increased both interest and efficiency. The necessary equipment was supplied by the Air Ministry, and it was now possible to run concurrently five separate courses on Bristol Pegasus, Mercury, Perseus, Taurus and Hercules type engines, each class being provided with its own exhibit room, lecture room and workshop.

The syllabus for the course of instruction on each of these types is divided into two parts, the first half being spent in the exhibit room.

In the exhibit room the engine is laid out in its dismantled condition, and each sub-assembly is lectured upon in sequence. At the conclusion of each lecture the class attends the lecture room for the purpose of taking down dictated notes; these form the salient points only of the lecture given, and conform to Air Ministry publications data. A set of exploded-view diagrams of each sub-assembly comprising the complete engine is also issued to each pupil. This forms the first half of the data compiled by the trainee.

Assembly and Maintenance

The second part is spent in the workshops, where the engine is first assembled and afterwards completely dismantled, employing only tools as used "in the field." Throughout this procedure the various sub-assembly fitting and inspection checks are made in the correct sequence, prior to fitting the units to the engine. Instruction is also given on ground running, flight maintenance and periodic installation checks.

The time occupied in the workshops during this half of the course does not allow for any written notes, and, therefore, a set of printed notes covering the instruction given, together with a set of perspective diagrams showing the tools as used "in the field" and during the instruction, are issued to form the second half of the complete compilation by the trainee.

On conclusion of the instructional course a written examination is held and results scrutinised in the orthodox manner. Five questions are requested, involving the first and second half of the instructional course. The examination papers are reviewed and assessed in compliance with A.M.O. and the assessments are submitted to Technical Training Command, R.A.F., for perusal, transmission to the relevant Group Headquarters, and finally to the airman's unit, where they are entered on his documentary records.

In addition to the courses of instruction, further short courses are held on "Engine Handling" for pilots, as well as a course for flight engineers.

Special Course for Pilots

Syllabuses for courses of instruction in these two categories are somewhat similar, differing mainly in the extent of the instruction given on engine components. For example, on the engine-handling course for pilots, it has been the Bristol company's experience that the pilot should have a working engineering knowledge of some of the sub-assemblies, such as the carburettor and its interconnecting links with the magneto; the two-speed supercharger; the operation of the hydromatic airscrew; the lubrication system, and other details directly concerned with power unit performance as operated from the cockpit. In order to reduce the likelihood of pilots imperilling the efficiency of the engine by complete lack of knowledge of these parts, the instruction given on sub-assemblies is very detailed and thorough. The final period is spent in lectures, and special stress is laid on showing power output curves, corrected with fuel consumption values, for the purpose of obtaining the best engine performance under various conditions.

As already explained, the flight engineers' course is similar, with the exception that each sub-assembly and inspection for engine defects is dealt with more comprehensively.

Raid on "Stonesless"

HAVING previously destroyed military objectives at the English town of "Random," the German wireless recently went one better and announced a raid by their "fast bombers escorted by Focke-Wulf fighters" on a factory plant at "Stonesless, north of Deal," where, they said, heavy damage was caused for the loss of one bomber. Their Italian friends, however, reported the raid to have been on Sandwich.

The facts are that four Fw 190s dropped four bombs and damaged private houses in a small country town; two of the raiders were destroyed and nobody was even seriously hurt. There is, of course, no such place as "Stonesless."

BEHIND THE LINES

Service and Industrial News from the Inside of Axis and Enemy-occupied Countries

From Japan

IT is reported from Japan that the Mitsubishi Yukogyo Co., the main suppliers of aircraft to the Japanese Air Force, have taken over the Nagasaki steel works, and are also expanding to other branches of armament production.

Hungarian Oil

WITH the participation of the Hungarian Government, a new company has been established for the development of recently discovered oil resources in Hungary. The company, which is expected to begin activities early next year, has been organised in co-operation with an Italian financial group.

In addition, a German-Hungarian oil company is about to be founded in Budapest. It is to exploit oil wells discovered by drillings made by the Berlin Wintershall A.G. in the South-Eastern part of the Alfoeld.

First Stuka Team

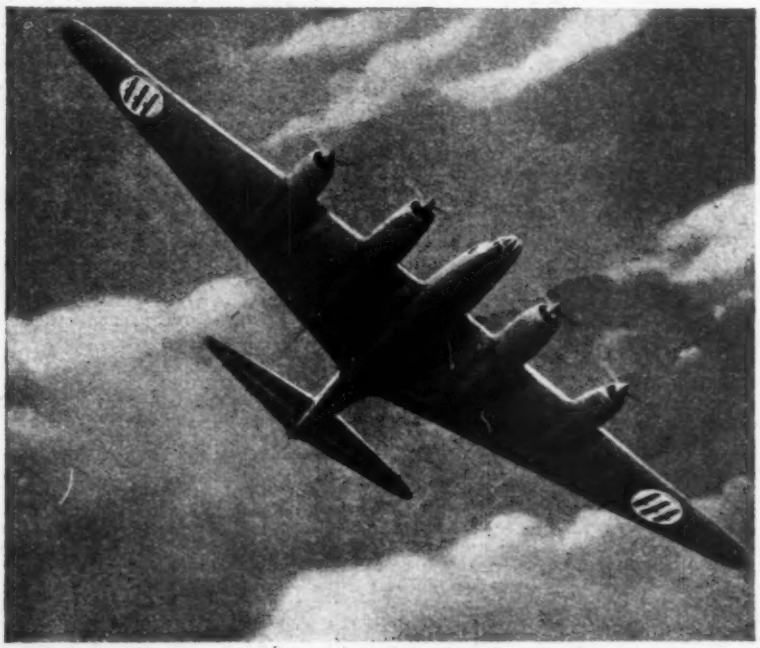
ACCORDING to the German Press the leading Stuka formation of the *Luftwaffe* is one commanded by Captain G. Pressler. Twelve members of this group have received the Knights Insignia to the Iron Cross, 22 pilots and ten wireless operators the German Gold Cross. Almost all members of the crews have been decorated with the Iron Cross First Class.

This much advertised Stuka unit has been operating both on the Russian Front, in the Channel area, and in the Mediterranean. From October, 1941, to November, 1942, the unit is reported to have been engaged on 1,040 sorties and dropped 7,500,000 kilogrammes of bombs. In widely publicised tributes to the efficiency of these Stukas, the German Press states that they have been responsible for the sinking of the Russian Battleship "Marat" and of dropping heavy calibre bombs on a Russian cruiser of the Kirow class, as well as of the sinking of two British cruisers and six transport ships.

The German Version

IN the absence of better news for home consumption, the German Press endeavours to show how small is the American air effort in the Far East. Quoting Jap sources, a German Shanghai correspondent reports that the total strength of air units operating in China is composed of 250 aircraft, out of which 150 are American. These Forces are said to have made only 25 attacks against Japanese-Occupied China, and to be mainly engaged on "guerrilla warfare." The American crews have been reinforced by the arrival of pilots from the States who are reported to have travelled via Russia. Apart from their own strength, the Americans are reported to have organised two Chinese squadrons and to be assisting in the establishment of a Chinese aircraft factory in Kweilin, in Southern China.

The German Press ridicules these American activities and calls the U.S.A.A.F. units commanded by General Chennault "Uncle Joe's Symbolic Flyers." But the Japanese seem to be taking a different view, as their recent bomber and fighter attacks on Kweilin show.



A RARE PICTURE: Italy's latest four-engined bomber, the Piaggio P 108 B, in flight. The aircraft has a span of 108ft. 3in. and a length of 81ft. 6in. It is powered with Piaggio PXII Rc 35 engines of 1,000 h.p. each. Maximum speed is about 290 m.p.h. at 13,000 ft.

A Wolfram Saga

TO take their minds off their own troubles, German propaganda tries to show how desperately the Allies are short of some essential war materials. In a leading German paper a tale is told of British attempts to secure wolfram, which would make a good theme for an exciting novel. It is said that since Britain has difficulties in purchases of Government-controlled Spanish ore, large-scale smuggling has been organised.

This is supposed to be fairly easy, since most of the Spanish mines are situated in Galicia, and on the North-Western coast of Spain. The ore—the story tells us—is transported to secluded spots on the coast and then reshipped to British sailing boats waiting outside Spanish territorial waters. This is not all, sometimes British "transport U-boats" loiter about to take over tons of wolfram from Spanish smugglers and whisk the precious cargo off to Britain!

Who said the Germans lack imagination?

Hungarian Training

ON January 7th, 1943, training is to begin at a special school for the N.C.O.s of the Hungarian Air Force. Candidates who have been admitted after a competitive examination will receive a four years' course of training without pay, but with free board, lodging and clothing. The courses are designed to provide for training of armament and maintenance personnel, for wireless operators and air photographers, but not for pilots.

The entrance examination is open to all Hungarian boys between 14 and 16 who are physically fit, have an elementary education, a clean record and an Aryan grandmother.

Airdromes for Norway

AS a part of the general defence scheme against any possible Allied invasion of the Continent, the Germans are particularly busy in Norway. Feverish activity is reported on the construction of a large airfield at Trondheim and at Kristianholme land has been expropriated by the Germans for the construction of an airport for Bergen.

A Rare Bird

SPANISH papers recently published photographs of a Stirling in flight bearing German markings. This aircraft is said to have been forced down by a night fighter, and the Germans are rejoicing at the opportunity "to study its characteristics in order to put it into their country's service."

Jubilating over this rare capture the Germans say that the aircraft is worth £25,000.

Correspondence

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

AN APPRECIATION

Service Despite Difficulties

SINCE I received the September 3rd, 1937, issue of *Flight* I have been fortunate in that I have not missed a single copy and that I have each edition up to date. Allow me to say here what a reliable, interesting and educative journal it is. I have only once answered an advertisement in it; this was to Wright's, Paterson, New Jersey, U.S.A., when I took advantage of their offer for one of the series of real live prints. I hadn't much hope of receiving a reply considering all the difficulties, but I have received the whole series of eight grand prints. Will you allow me hereby to call America and say "Thanks, Pal"? GEORGE HOULTON SMITH.

THE TORPEDO BOMBER

Weird and Wonderful Designs

TO restore the peace of mind of your correspondent Mr. T. G. Coultiss, and to dispel the qualms which may have arisen in any other of your equally literal-minded readers, I feel bound to write again to explain to them that my last letter to you on "The Torpedo Bomber" was hardly written in all seriousness; but having read Mr. Hudson's previous epistle I could not resist the temptation of parodying his design and, if possible, of producing something which would be even less likely ever to become airborne.

I really did not believe that anyone could take my letter seriously; but I suppose it was a risky thing to do when so many people with magnificent theories but no practical experience are displaying their weird and wonderful designs to an open-mouthed audience.

The thing which these theoreticians will not appreciate is that the pilot of their fast, high-powered aircraft is compelled, after dropping, to fly at very low altitude almost directly over the target, because of the very wide turning circle of such machines. Moreover, until a new torpedo is developed, it will not be possible to use the terrific speed which they advocate at the one moment at which it is most wanted, because the torpedo has to be released at such a comparatively low speed.

It is interesting also to see that Mr. L. W. Rosenthal, who is so full of contempt for the amateurs' designs, is unable in his article to make any constructive suggestions himself. But, of course, the Editor may have published this item simply as a bait to provoke discussion amongst such fish as would rise!

J. R. GODLEY.

BOMBER ESCORT

Lesson of the Eindhoven Raid

FURTHER to the correspondence appearing under the heading "Bomber Escort," by Mr. E. J. Griffiths and Mr. S. Greenwood. The policy of opening up a "Daylight Air Front" appears to be more than ever overdue. Up to now our daylight offensive appears to be confined to Belgium and Northern France and it is certainly time some effort was made to carry the war into Germany proper.

Recent news re the bombing of the Philips' Works at Eindhoven shows up our inability to give the necessary full fighter cover. I believe that on the latter part of the way out to the target the bombers were unprotected. The wireless quoted "Aircraft of Fighter Command provided cover to the bombers when returning from the attack. *Twelve* of our *bombers* are missing." *Verb sap.*

The policy of making certain bombers into defensive fighters to convoy the real bomber is certainly like present Naval tactics. No large battleship moves without its escort, and the same formula appears to get our merchant convoys through very successfully.

The very illuminating and comprehensive series of articles which appeared in *Flight* under the most apt title "*Fighter* Armament" leave little doubt on the trend of the attacker's armaments; we read on page 521: "Weight of fire, rather than rate of fire became the yardstick of efficiency."

While every effort is being made in this direction to increase the hitting power of the fighter, nobody appears to advocate a greater weight of fire for the bomber and more armour. Everyone appears to excuse the position on account of the attendant difficulties of mounting heavier guns, their length, weight of ammunition and turret operation.

Certainly there is some justification in this respect, but the policy of fully arming separate machines to act as defensive escort overcomes these difficulties and is surely worth careful consideration.

The deadliness of daylight precision-bombing has been clearly demonstrated by the Fortresses, and we must be able to improve our efforts until such times as we can say no bomber was lost to fighter attack—the bomber must go through and return safely. JOHN CONDON.

COMPARISON IN PERFORMANCE

Rival Types of Operational Aircraft

AFTER reading Mr. Henderson's letter in *Flight* of December 3rd I feel compelled to criticise the latter part of his article.

To Mr. Henderson's statement that the speed of the Spitfire Mk. V is over 400 m.p.h., I can only say that it has been reliably quoted "as about 370 m.p.h."

With regard to the Hurricane IIC, I must admit that the four-cannon armament has greatly increased the destructive power of this great fighter, but at the same time it must be realised that the wing-loading has greatly increased and the speed reduced to 312 m.p.h. by the fitting of external petrol tanks, cannon and air filter.

Finally, Mr. Henderson concludes his letter by saying that the *Luftwaffe* suffers from the lack of certain important equipment. To this I say that the Germans have a formidable heavy bomber in the Heinkel 177; that power-operated multi-gun turrets have been installed in German aircraft for some time now, e.g., Focke-Wulf Kurier; that the Mosquito is rivalled by the Messerschmitt Me 210; and that the D.B.606 unit in the Heinkel 177 develops 2,300 h.p. ROBERT STEWART.

BOOST PRESSURE VARIATION

May be Due to Slight Fault

ALTHOUGH not being able to give a satisfactory explanation to "Puzzled's" problem, I would like to point out that F. Ashley's law of supply and demand presumably applies to an engine with an independently driven supercharger and no boost control. This would account for the manifold pressure building up, due to the decrease in crankshaft revs.

My own explanation is that the increased boost pressure remaining uncorrected must be due to some slight fault on that one particular engine and does not apply to engines in general.

Can any reader confirm the phenomenon causing "Puzzled's" problem in November 19th issue?

K. V. P.

No Control at Zero Boost

IN reference to the boost question raised by your correspondent in a recent issue, I believe the answer falls under the following heads, viz.: Blower efficiency in relation to r.p.m.; the demand of the engine in relation to r.p.m.; and the effect of boost control.

In the case of the engine quoted, namely, the Rolls-Royce Merlin XX, I believe that at the boost quoted (zero) the r.p.m. will be round about 2,000. At this point a reduction in r.p.m. will not affect the compression ratio of the blower in direct proportion to the r.p.m., whereas the demand of the engine always follows the r.p.m. closely.

Thus the demand falls off more rapidly than the compression ratio of the blower. At zero boost, the boost control is out of action owing to the action of the atmospheric change-over cock, so that the throttle opening is fixed. The net effect will be a slight rise in boost pressure.

I think this clears the point. I have no doubt that someone will have some curves somewhere to clinch the matter,

NAVY PLUMBER.

Service Aviation

Royal Air Force and Fleet Air Arm News and Announcements

HANDING OVER: The scene at a Bomber station in England as the R.A.F. Ensign is hauled down and the Stars and Stripes run up when the airfield was taken over by the U.S.A.A.F. Col. C. B. Overcracker took over from Sqn. Ldr. D. A. Batwell.

Awards

Fleet Air Arm

THE KING has been graciously pleased to approve the following awards:—

DISTINGUISHED SERVICE CROSS

Temp. Sub. Lt. (A) D. C. SCOTT, R.N.V.R.—For great skill and resolution in two attacks upon an enemy convoy bound for Tripoli, when his torpedoes hit an enemy merchant ship and a tanker.

DISTINGUISHED SERVICE MEDAL

Petty Officer Airman O. SPOWART.—For outstanding services as Air Gunner in bombing and bombardment operations in the Western Desert and in the organisation of the Air Gunners and W/T in his squadron.

Royal Air Force

Far East

THE KING has been graciously pleased to approve the following appointment and awards to members of the Royal Australian Air Force, in recognition of conspicuous service in operations against the Japanese:—

C.B.E. (MIL.)

Act. Grp. Capt. C. W. PEARCE, D.F.C.

DISTINGUISHED FLYING CROSS

Act. Sqn. Ldr. J. M. HAMPSHIRE.
F/O. B. H. HIGGINS.

DISTINGUISHED FLYING MEDAL

Flt. Sgt. A. W. DUCAT.
Flt. Sgt. M. L. FRANKLIN.
Flt. Sgt. H. D. H. LEARMONTH.
Flt. Sgt. E. R. OLDFIELD.
Sgt. W. L. ALLEN.
Sgt. R. C. LINDSAY.
Sgt. C. W. MILLER.
Sgt. H. P. RILEY.

B.E.M. (MIL.)

Cpl. A. B. IRELAND.

THE KING has been graciously pleased to approve the following awards in recognition of gallantry displayed in flying operations against the enemy:—

DISTINGUISHED SERVICE ORDER.

Act. Wing Cdr. C. B. F. KINGCOME, D.F.C.—This officer has completed an extremely large number of sorties and has led the wing on numerous occasions. He was rendered outstanding service and has destroyed at least eleven enemy aircraft and damaged many more.

Sqn. Ldr. T. M. BULLOCH, D.F.C., No. 120 Sqn.—During recent weeks, this officer has carried out a number of successful operational sorties against enemy submarines, many of them in bad weather. By his exceptional skill and keenness Sqn. Ldr. Bulloch has set a most inspiring example.

BAR TO DISTINGUISHED FLYING CROSS.

Flt. Lt. J. J. LE ROUX, D.F.C., No. 91 Sqn.—Since being awarded the D.F.C. this officer has destroyed a further five enemy aircraft. In addition to his air victories he has attacked shipping and targets on the ground with considerable success.

Act. Flt. Lt. W. V. CRAWFORD-COMPTON, D.F.C., No. 611 Sqn.—This officer has led his flight on many operational sorties with great skill and success. Since being awarded the D.F.C. he has destroyed a further five enemy aircraft, bringing his total to seven.

F/O. G. PEPPER, D.F.C., No. 29 Sqn. (since deceased).—F/O. Pepper and P/O. Toone, flying together as pilot and observer, have formed a perfect night fighting team. They have destroyed at least six enemy aircraft.

Capt. E. C. SAVILLE, D.F.C., S.A.A.F., No. 112 Sqn.—One day in October, 1942, this officer led a formation of fighter aircraft on an interception patrol. A number of Me 109s was observed and engaged after a short pursuit. During the combat, Capt. Saville destroyed two enemy aircraft. Subsequently, he skilfully led his formation to base where, in spite of difficulties, a perfect landing was effected. Since being awarded the D.F.C. last September, he has destroyed at least three enemy aircraft.

Group Capt. C. W. Pearce, D.F.C., who has been awarded the C.B.E. for conspicuous service against the Japanese.

DISTINGUISHED FLYING CROSS.

P/O. J. H. TOONE, D.F.M., No. 29 Sqn. (since deceased).—For citation see F/O. Pepper, D.F.C.

Act. Flt. Lt. R. RANKIN, R.A.A.F., No. 272 Sqn. This officer has taken part in many operational sorties over France and the Low Countries as well as in the Middle East. He has participated in low level attacks on roads, airfields and enemy shipping, while in combat he has destroyed three enemy aircraft. In November, 1942, he led his flight on an attack on El Aouina airfield and later near Tunis he destroyed one hostile aircraft.

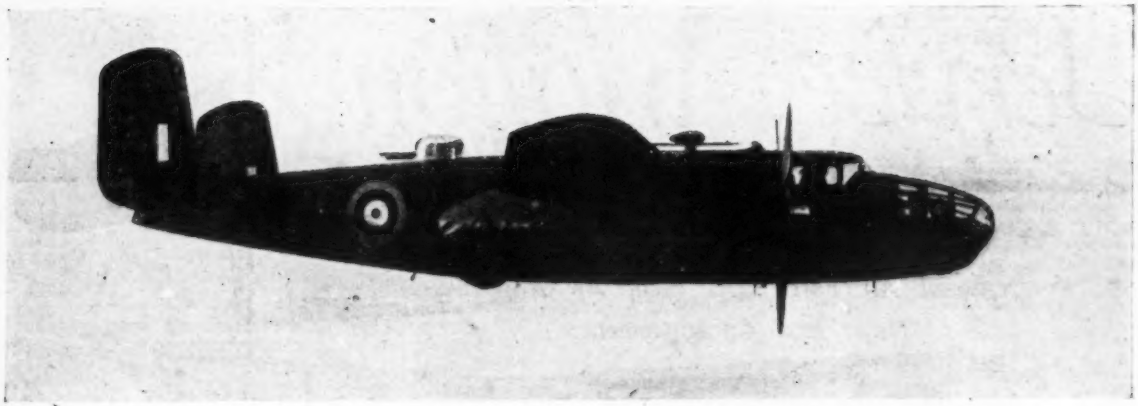
F/O. J. MARKHAM, No. 269 Sqn.—In October, 1942, this officer captained an aircraft engaged in an anti-submarine patrol in the vicinity of an important convoy. Whilst flying at some 4,000 feet, he observed a U-boat, surfaced on the water. F/O. Markham immediately dived to attack and, achieving almost complete surprise, straddled the submarine with depth charges before it could completely submerge. Excellent photographs were obtained of wreckage and oil patches.

Act. Flt. Lt. M. O. OSBORNE, R.A.F.V.R., No. 248 Sqn.—As an observer, Flt. Lt. Osborne has completed many hours' operational flying in Dutch, French and Norwegian coast reconnaissances, convoy escorts and fighter interceptions.

Act. Flt. Lt. F. J. ROBINSON, R.A.F.V.R., No. 203 Sqn.—As senior observer, Flt. Lt. Robinson has performed his duties with zeal and enthusiasm and has flown many hours operationally, despite the hard work he has done in training and in commanding various detachments.

Act. Flt. Lt. W. T. E. ROLLS, D.F.M., R.A.F.V.R., No. 126 Sqn.—Since being awarded the D.F.M. this officer has destroyed a further four hostile aircraft, bringing his total victories to eight. One day in October, 1942, although enemy fighter planes were attacking overhead, he led his section in an attack on eight German heavy bombers escorted by fifteen fighters. During the ensuing combat he personally destroyed a Ju. 88.

Act. Flt. Lt. L. V. SANDERS, R.A.F.V.R., No. 229 Sqn. (since deceased).—Before this officer arrived in Malta he had completed many sweeps over France. One day in May he led his flight in a very successful attack on three Ju. 88s intercepting them before they could release their bombs.



DELIVERY FLIGHT : A North American Mitchell over the St. Lawrence river on its way to Britain. General arrangement drawings and some details of the Mitchell were published in our issue of July 9th, 1942.

SERVICE AVIATION

Act. Flt. Lt. R. I. A. SMITH, R.C.A.F., No. 126 Sqn.—Flt. Lt. Smith has been responsible for the destruction of six enemy aircraft since his arrival in Malta. One day in October, 1942, he led his flight in a determined attack on nine hostile bombers with a large fighter escort, and in spite of intense opposition by the fighters, Flt. Lt. Smith personally destroyed a Ju. 88, while one Macchi 202 was destroyed by other pilots of his flight.

F/O. A. W. CLIFFORD, R.C.A.F., No. 162 Sqn.—This officer is a first-class navigator, who has served both in the United Kingdom and the Middle East. He has always shown the greatest determination and courage, pressing home his attacks regardless of the difficulties and dangers he has encountered.

F/O. W. C. E. CRAIG, No. 148 Sqn.—This officer has completed many operational sorties against targets in Italy, Greece and Crete. One night in April, 1942, he made two separate sorties against Comiso and on the following nights he again made two separate attacks. The opposition was severe and the base from which he was operating was attacked continuously. Later, when detailed to attack Derna airfield, he had released one stick of bombs when his engine began to fail; nevertheless, he persisted in a second run and successfully released the remainder of his bombs. On a previous sortie he had destroyed two hostile aircraft and the fuel installation at Derna airfield.

Long-distance Ops.

F/O. E. A. HOLDAWAY, R.N.Z.A.F., No. 37 Sqn.—F/O. Holdaway has completed many long-distance operational flights over Cyrenaica, Crete, and enemy-occupied territory in Egypt. As a captain of aircraft, he proved to be an outstanding figure during the recent emergency. Pressing home each attack with coolness and determination, whatever the opposition, he never failed to complete his mission, sometimes with his aircraft in a state of unserviceability which would have fully justified a return to base.

F/O. I. MACLEAN, R.A.F.V.R., No. 252 Sqn.—This officer took part in a particularly successful reconnaissance off Brest in the face of intense and accurate gun fire. In the Middle East, in June, 1942, he made a single aircraft offensive reconnaissance and despite very heavy opposition destroyed two enemy aircraft and damaged others.

F/O. F. W. MADSEN, R.A.A.F., No. 459 (R.A.A.F.) Sqn.—One day in July, 1942, this officer was captain of an aircraft detailed for a dawn attack upon an Italian convoy bound for Tobruk. In the face of intense and accurate fire from the shipping he pressed home his attack and released his bombs across a merchant vessel. Again later in the same month he made a determined daylight attack on some "F" boats despite heavy defences. On another occasion in August he scored two hits on a hostile boat.

F/O. V. K. O'BRIEN, R.A.A.F., No. 459 (R.A.A.F.) Sqn.—One day in July, 1942, as captain of aircraft, F/O O'Brien made a determined attack on enemy shipping near Sidi Barrani and, despite heavy opposition, inflicted severe damage on a barge. Again in August he attacked an "F" boat in the face of heavy and accurate gunfire from the vessel. After releasing his bombs he pressed home the attack with machine-gun fire. During this engagement his aircraft was badly damaged and the port engine caught fire. Displaying a calm and resourceful courage, F/O. O'Brien extinguished the fire, jettisoned all movable equipment, and successfully flew his aircraft some 200 miles to base on one engine.

F/O. J. W. PELLETIER, R.A.A.F., No. 148 Sqn.—This officer has completed many operational sorties against targets in Germany, Cyrenaica, Libya, Greece and Crete. One day in March, 1942, he was captain of an aircraft detailed to attack Benghazi. On the outward journey engine trouble developed, but he successfully brought his aircraft down on the sea and was able to embark the entire crew in the dinghy. They were 12½ hours on the water before being rescued. During this period F/O. Pelletier remained calm and cheerful and so kept up the spirits of his crew that under his leadership they were on operations again within a short period. One month later he participated, two nights in succession, in attacks on Comiso, from a base in Malta, at the peak of the "blitz."

F/O H. RAWLINSON, R.A.F.V.R., No. 208 Sqn. During the present campaign, this officer's work has been of a consistently high quality. He has always shown great tenacity in obtaining and bringing back accurate and detailed reports of enemy dispositions.

F/O. F. C. E. WATERMAN, R.C.A.F., No. 40 Sqn.—In August, 1942, when engaged in an attack on shipping at Tobruk, this pilot had serious trouble with his engines. Evasive action was almost impossible, but with great determination he proceeded to the target. Despite these difficulties, heavy gunfire and concentrations of searchlights, F/O. Waterman, with perfect calmness, released his bombs along the jetties at Tobruk.

Lt. R. J. P. COLLINGWOOD, S.A.A.F., No. 1 (S.A.A.F.) Sqn.—For the last ten months this officer has served in the Western Desert, and although handicapped by ill-health, he has participated in many operational sorties. One day early in July, 1942, when 14 enemy aircraft were destroyed over the El Alamein line, Lt. Collingwood was personally responsible for the destruction of three, bringing his victories up to at least four.

Lt. D. W. MAREE, S.A.A.F., No. 208 Sqn.—During the present campaign this officer has completed a large number of operational sorties. In the last two months particularly, Lt. Maree has set a fine example of courage and devotion to duty, and this has been reflected in the pilots of his flight.

Lt. D. R. S. WAUGH, S.A.A.F., No. 1 (S.A.A.F.) Sqn.—During the last ten months this officer has flown in many offensive sorties, the majority of which have been over enemy territory and often at great distances from his base. He has personally been responsible for the destruction of six hostile aircraft in the air, and damaged many others. One day in July, 1942, he led an attack against a formation of enemy bombers escorted by fighters, resulting in the destruction of five of the bombers. On another occasion, when he was separated from the rest of the squadron, he was attacked by four fighters. Although his aircraft was badly damaged, he destroyed one of the enemy fighters and flew his aircraft safely back to base.

Two U-boats

P/O. S. E. ESLER, R.A.F.V.R., No. 120 Sqn.—This officer has severely damaged two enemy submarines. On three other occasions he has taken part in operational sorties necessitating almost continuous blind flying owing to extremely bad weather.

P/O. K. W. S. EVANS, R.A.F.V.R., No. 126 Sqn.—This officer is an excellent leader, and has destroyed at least four hostile aircraft. One day in May, 1942, he led his section in an attack on an enemy bombing force, heavily escorted by fighters. The section destroyed one fighter and probably a bomber, and forced the enemy to jettison their bombs and return without crossing the coast.

P/O. J. D. RAE, R.N.Z.A.F., No. 249 Sqn.—P/O. Rae has destroyed at least six hostile aircraft. Two days after his arrival in Malta he was shot down and wounded. His keenness to return to active duty in the air, before his wounds were properly healed, was an inspiration to all.

P/O. L. S. REID, R.A.A.F., No. 185 Sqn.—One day in October, 1942, this officer led his flight against a formation of enemy bombers and fighters totalling approximately 70 aircraft. Although heavily outnumbered he destroyed one Ju. 88, and through his successful interception the enemy dropped their bombs harmlessly into the sea.

P/O. W. C. WALTON, R.A.F.V.R.—Since July, 1942, this officer has destroyed at least four enemy aircraft and damaged others. One day in October, 1942, when he was flying with the squadron, a formation of six enemy bombers escorted by 20 fighters was sighted approaching Malta. He immediately attacked the bombers, and they broke away. By skilful manœuvring P/O. Walton made a head-on attack on one Ju 88, which he destroyed. During a period of intense aerial activity over Malta large enemy formations frequently attempted to attack the island. On many occasions this officer, by his skilful interception, forced the enemy bombers to turn back before releasing their bombs.

Tobruk Supplies

W/O. C. A. BOURNE, No. 216 Sqn.—This air observer has completed many sorties over enemy territory. In June, 1941, he took part in a leaflet raid over Syria, and in December, 1941, he made a night landing within the Tobruk defences, carrying supplies to the garrison.

W/O. A. J. G. VAN RASSEL, R.C.A.F., No. 40 Sqn.—W/O. Van Rassel has completed numerous operational sorties. One night in July he was detailed to attack shipping at Tobruk. Extremely heavy gunfire was encountered, and two flares ignited approximately 150 ft. above the aircraft, causing it to be illuminated and caught by the searchlights. Despite these difficulties and the damage caused to the aircraft by the gunfire, W/O. Van Rassel executed successful evasive tactics, and later made a crash landing without injury to the crew or further serious damage to his aircraft. Although unable to return to his base for three days, this officer returned to operational flying the day after his arrival. On three occasions he experienced serious trouble with his engines, but this did not deter him from completing his tasks.

Sqn. Ldr. P. R. BARR, No. 107 Sqn. (since reported missing), and P/O. W. BARFOD, No. 107 Sqn. (since reported missing).—Sqn. Ldr. Barr and P/O. Barfod have flown together, as captain and navigator/bomb aimer respectively, in attacks on important enemy industrial targets and shipping. On the night of the 25th-26th June, 1942, they participated in an attack on an airfield in the Low Countries as part of the operation undertaken by 1,000 bombers that night. Although the target was heavily defended, a most successful attack was executed. In September, 1942, they took part, with great success, in an attack on a whale oil ship in Cherbourg harbour.

P/O. C. D. BOOTHBY, D.F.M., R.A.F.V.R., No. 161 Sqn. and P/O. L. G. A. REED, No. 161 Sqn.—P/Os Boothby and Reed have flown together on many sorties as pilot and gunnery leader respectively. In hazardous circumstances they have both displayed resolute determination and fortitude in keeping with the highest traditions of the R.A.F.

Lt. T. E. COOK, S.A.A.F., No. 40 Sqn.—One day in November, 1942, this officer was engaged, with another pilot, on a reconnaissance over the Sollum area when they were intercepted by two enemy fighters. Lt. Cook immediately turned to engage the hostile aircraft and with great skill and determination he fought them for twenty-five minutes before returning to base. As a result of this courageous action his fellow pilot was able to continue his reconnaissance and bring back valuable information.

Sq. Ldr. H. L. I. BROWN, No. 616 Sqn.—Since the war began, Sq.-Ldr. Brown has taken part in a large number of operational sorties both in this country and in the Middle East. During the campaigns in Greece and Crete he performed excellent work and destroyed four enemy aircraft.

Act. Flt. Lt. W. H. B. HUGES, R.A.F.V.R., No. 238 Sqn.—In November, 1942, this officer cap-

tained a heavy bomber, detailed to attack Stuttgart. At one point on the outward flight, Flt. Lt. Hiles brought his aircraft down to 200 feet while his gunners attacked a goods train and put it out of action. He then flew on to his objective and bombed it. During the return journey attacks were made on the targets on the ground, including four separate attacks on goods trains and in each instance, locomotives were set on fire; Flt. Lt. Hiles also attacked an enemy aircraft on an airfield.

F/O. K. MUNRO R.A.A.F., No. 10 Sqn.—As captain of aircraft this officer has displayed exceptional determination. He has participated in several sorties and, in spite of hazards and difficulties, has always attempted to complete his allotted task. On a recent occasion, when returning from Genoa, he skilfully overcame a difficult situation and landed his aircraft safely. In November, during a flight to Turin, one engine in his aircraft failed whilst still some distance from the target. With admirable resolution he continued his mission, bombed his target, and eventually accomplished the return journey safely.

F/O. F. B. MCCULLOCH, R.A.F.V.R., No. 23 Sqn.—This officer has completed many sorties, involving attacks on enemy airfields, installations, factories and railway communications. He has invariably displayed great skill, keenness and resource.

DISTINGUISHED FLYING MEDAL.

Flt. Sgt. W. RANDLE, No. 150 Sqn.—Flt. Sgt. Randle has taken part in many operational sorties. In hazardous circumstances he has displayed courage and fortitude in keeping with the highest traditions of the R.A.F.

Flt. Sgt. W. H. WORTLEY, R.C.A.F., No. 37 Sqn.—Flt. Sgt. Wortley has participated in attacks on targets in Cyrenaica and enemy-occupied territory in Egypt. He has always shown the utmost coolness and determination in the face of heavy enemy opposition and his skill as a bomb aimer and navigator has been of the highest order.

Sgt. G. A. BARTON, No. 148 Sqn.—Sgt. Barton is an exceptionally reliable opefational gunner, who has displayed the utmost keenness to fly against the enemy. One night in March his aircraft was shot down in Cyrenaica. For 14 days the crew were behind the enemy lines. Sgt. Barton's high spirit kept their morale at a high level, and when rescued they were able to produce valuable information concerning the movements of the enemy. On another occasion, when flying as rear gunner, this airman's turret became unserviceable. When attacked by an enemy fighter his calm commentary enabled his captain to take evasive action and escape from the German aircraft.

Sgt. R. CURTIS R.C.A.F., No. 104 Sqn.—Sgt. Curtis is a most determined pilot, who throughout his operational career has always succeeded in his attacks, which have sometimes been made in the face of severe ground opposition. Once following an attack on the marshalling yards at Messina, his aircraft was hit and severely damaged. With great skill he flew it back to base, executing a masterly landing without injury to his crew. Three weeks later an engine of his aircraft failed while over the target area, but by superb airmanship he managed to maintain height for two hours, in bad weather conditions, before making a successful crash landing without injuring his crew.

Sgt. G. W. DAWSON, No. 38 Sqn.—Sgt. Dawson has taken part in many operational flights over the whole theatre of operations in the Eastern Mediterranean basin. One night in November, 1941, he largely contributed by his sound work to the rescue of his crew after they had been forced to abandon their aircraft well out into the desert. Again, one night in March, on a return journey from Crete, the engines were failing and his aircraft began to lose height rapidly. By his prompt action the aircraft was brought safely home.

Sgt. W. GORDON, No. 37 Sqn.—Sgt. Gordon has completed a large number of long-distance operational flights, including raids on objectives in Cyrenaica, Crete, Greece, the Dodecanese, and enemy-occupied territory in Egypt. One night in July he attacked Tobruk harbour successfully. On the return journey, owing to engine trouble, he was forced to crash land his aircraft in the desert and achieved this without injury to the crew. Ascertaining from some friendly Bedouins that he was well behind the enemy lines, an unsuccessful attempt was made to repair the aircraft. It was then set on fire, and all valuable equipment destroyed. Sgt. Gordon and his crew set out to walk to the British lines, and during the next five days met with many adventures. On one occasion a German lorry passed within 300 yards of them. Eventually, a native was found who led them safely to the British lines.

Sgt. L. HOLLIDAY, No. 70 Sqn.—As a captain of aircraft, Sgt. Holliday has shown a fine spirit and set an excellent example to the other members of his flight. During a recent period of intensive operations he continued to fly, although suffering from a disability which necessitated his neck and chin being bandaged.

Sgt. H. G. JAMES, No. 216 Sqn.—In August, 1942, Sgt. James was pilot of an aircraft which was attacked by two Me 109s and badly damaged. He was wounded in the shoulder and leg, but, despite these injuries, made a good landing. The enemy continued to attack, and the aircraft burst into flames. Some of the crew were seriously hurt. Sgt. James walked 2½ miles before being given a lift on a camel to obtain assistance. Refusing further medical aid for himself, he insisted on guiding the rescue party back.

Sgt. R. A. SEIDEL, R.A.A.F., No. 162 Sqn.—This airman has frequently been detailed for dangerous flights over heavily defended areas. Throughout, Sgt. Seidel had displayed great devotion to duty.

Submarine Sunk

Sgt. B. F. SNELL, No. 58 Sqn.—In September, 1942, this officer was captain of an aircraft, and when flying at 7,000 feet he sighted an enemy U-boat fully surfaced. He dived and attacked the submarine while it was still on the surface. Complete surprise was achieved, and the vessel disappeared. Later, debris and a large patch of oil were seen floating on the water.

L.A/C. G. G. CRICKMER, No. 216 Sqn.—This air-gunner has participated in a number of night sorties over Libya, and in December, 1941, landed within the Tobruk defences with stores and personnel for the garrison.

L.A/C. S. A. HALL, No. 216 Sqn.—For the past three years this airman has served as rigger and air-gunner, and his operational record is outstanding. In December, 1941, he landed by night within the defences of Tobruk, carrying stores and personnel for the garrison.

Roll of Honour

Casualty Communiqué No. 185.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. "Casualties" in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Royal Air Force

KILLED IN ACTION.—Sgt. E. A. Donlin; Sgt. F. H. King; P/O. P. T. Lawson; Sgt. H. C. McDougall; Wing Co. G. H. Stainforth, A.F.C.; Flt. Sgt. L. H. Swain; Sgt. E. Vernall; Flt. Sgt. W. L. Williams.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. G. H. D. Dawson; Flt. Lt. A. J. Smith.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. F. W. Ashfield; Sgt. J. L. Bell; Sgt. A. G. Bocock; P/O. I. O. Davies; F/O. E. G. Fowler; Sgt. P. Harrison; Sgt. J. Hudson; Sgt. P. J. Jordan; Flt. Sgt. J. C. McGregor, D.F.M.; Sgt. T. H. Mate; P/O. M. Murphy; Sgt. H. A. Newman; Sgt. D. G. Penman; Act. Flt. Lt. J. W. Potter, D.F.M.; Sgt. J. S. Pullen; Act. Sqn. Ldr. J. R. Rainford, D.F.C.; Sgt. T. R. Riddell; Sgt. K. V. B. Roe; Flt. Sgt. R. N. Smith; P/O. T. H. Smith; Flt. Sgt. J. Stables; Sgt. R. H. Taylor; P/O. J. R. Topping; Flt. Sgt. E. Weightman; Sgt. J. P. Wilson.

WOUNDED OR INJURED IN ACTION.—Wing Cdr. E. J. Carter, D.F.C.; Lt. Sgt. C. L. French; P/O. G. S. Jeffreys; Flt. Sgt. I. K. Nicol; Flt. Sgt. R. C. Reid; Flt. Lt. J. Simpson; P/O. R. F. Tinkler.

DIED OR WOUNDS OR INJURIES RECEIVED IN ACTION.—Flt. Lt. N. A. Buchanan; Sgt. L. C. Tatton; Sgt. H. R. Welby.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. J. S. Ballow; Sgt. W. Buckley; Sgt. A. M. Cockie; P/O. R. H. Groom; Sqn. Ldr. C. M. Howell; P/O. H. W. Long; Act. Sqn. Ldr. P. B. Robinson, D.F.C.; Sgt. L. Tate; P/O. W. A. Thomas; Sgt. P. A. Walker.

MISSING.—P/O. K. Bannerman-Pillai; Flt. Sgt. A. T. J. Barnicott; Sgt. G. Birch; Sgt. D. H. Brown; Sgt. U. E. A. Burford; Sgt. P. R. Carter; Sgt. J. C. Chambers; P/O. E. A. Clarke; Sgt. J. H. Davies; Sgt. J. G. E. Davis; Flt. Lt. J. Dawson; P/O. W. H. Day; Sgt. R. Dicks; Sgt. G. F. Eldridge; Flt. Sgt. W. N. Geddie; Flt. Sgt. M. J. Glynn; Sgt. R. J. Grosvenor; Sgt. J. W. Gunning; P/O. G. H. Hanson, D.F.C.; Sgt. J. A. J. D. Hatton; Sgt. L. Hayes; Sgt. C. O. Howard; Flt. Sgt. W. K. Hughes; Sgt. G. E. Jones; Sgt. A. F. C. Kensett; Flt. Sgt. W. F. Keatley; Sgt. R. F. Lowrie; Sgt. C. McGough; Sgt. C. MacKenzie; F/O. G. A. Mockridge; Sgt. A. Moffat; Sgt. A. J. Ottoway; Sgt. H. C. Peters; Sgt. H. H. L. Pryce; Sgt. R. F. Reynolds; Sgt. J. B. Runnicles; Flt. Lt. W. J. Scale; P/O. J. S. Shaw; Flt. Sgt. P. Silverman; Sgt. N. F. Smethurst; Sgt. G. A. Smith; Sgt. J. L. Spence; Sgt. R. Spencer; Sgt. A. G. Sutton; Sgt. S. Swain; Sgt. A. W. Vivian; Sgt. S. Watson; Sgt. S. G. White; Flt. Sgt. H. Williams; Sgt. S. A. Witchell.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Sgt. D. Abberley; P/O. W. G. H. King; Sgt. R. N. Lamond, Sgt. H. Shephard; Flt. Lt. J. R. Wyllie; P/O. J. G. Young.

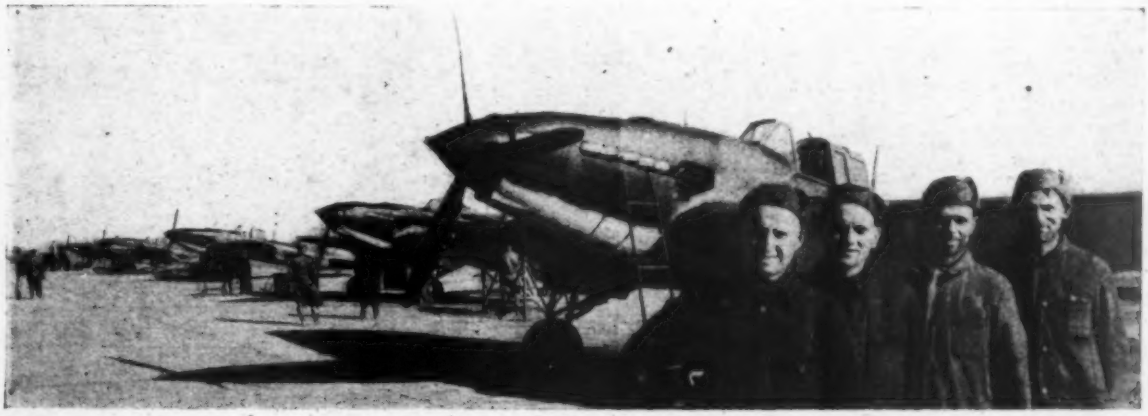
KILLED ON ACTIVE SERVICE.—Sgt. L. Bacon; Flt. Sgt. W. D. L. H. Bell; Sgt. A. J. Betteridge; Sgt. A. Bradshaw; Sgt. W. Brown; P/O. H. G. Burrage; P/O. N. L. Casely; Sgt. G. W. Catling; Flt. Sgt. W. E. N. Cleall; Sgt. T. Crankshaw; Sgt. L. S. Davies; Cpl. C. Dorman; Cpl. S. Elliott; Sgt. S. A. Gardner; L.A/C. E. G. Goodall; Sgt. R. F. Hartley, F/O. J. S. M. Helme; L.A/C. V. Holman; F/O. B. D. Holme Sumner; Sgt. P. A. Jardine; Flt. Sgt. T. W. Jupp; Sgt. E. Kureen; Sgt. C. H. Kemp; Sgt. R. R. Law; P/O. J. H. Lindley; L.A/C. D. C. Lord; Sgt. J. H. M. McNeill; L.A/C. F. W. A. Musto; Flt. Sgt. G. Naylor; Flt. Sgt. R. F. Rietiker; P/O. The Hon. G. W. Rodney; L.A/C. V. H. Shute; Sgt. J. Simpson, D.F.M.; Sgt. G. W. Slack; Sgt. A. Smith; Sgt. C. A. Sollas; The Rev. Sqn. Ldr. J. F. Sutcliffe; P/O. C. H. Williams; F/O. W. M. E. Winter; L.A/C. O. W. Wynne.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—A/C.2 P. Smithson.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A/C. H. Chaplain, L.A/C. A. G. Eardley; L.A/C. R. J. Hawtin; A/C.1 L. H. McGinley; Sgt. W. E. Perkins; A/C.1 M. Vogel; Sgt. P. G. Williams; Cpl. G. Woosey.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Sgt. J. A. Clague; Sgt. M. R. Mitchell.

DIED ON ACTIVE SERVICE.—A/C.1 A. Asker; L.A/C. D. Barnett; F/O. D. A. W. Coles, D.F.C.; Sgt. F. J. Dawson; L.A/C. C. Denton; L.A/C. D. H. G. Dumont; L.A/C. A. R. Goodwin; Flt. Lt. W. B. H. Griffith; Cpl. W. T. J. Hart; Cpl. G. H. Hughes; A/C.1 P. Jones; Act. Flt. Sgt. R. M. Kinnear; Act. Flt. Sgt. E. L. Kirk; Sgt. F. J. Lawson; Sqn. Ldr. C. C. Marsden; A/C.2



AWAITING TEST: A line of Stormovik dive-bombers ready for flight testing at a Russian aircraft factory. In August this factory won first place for output.

SERVICE AVIATION

F. J. Miley; L.A/C. D. Penn; L.A/C. P. H. Thorpe; A/C.2 A. Walker; L.A/C. K. Ward; Sgt. L. C. Weatherly; Cpl. A. Williamson; Cpl. J. A. Wiseman; Cpl. J. W. T. Worral; Cpl. R. S. Zucker.

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—A/CW.2 F. E. Bayley.

Royal Australian Air Force

WOUNDED OR INJURED IN ACTION.—Sgt. K. H. Freer; Sgt. H. M. Taubman.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. G. H. Green; Sgt. J. K. King; Sgt. R. G. McDowall; Sgt. A. S. Williams.

MISSING.—Sgt. A. E. Brown; Flt. Sgt. J. A. Bryden; P/O. A. C. Campbell; Sgt. K. J. Danks-Brown; Sgt. H. F. Grace; Flt. Sgt. T. C. Harris; Sgt. G. R. Hill; Sgt. H. W. Holgate; F/O. D. de M. Partridge; Sgt. T. D. Shepherd; Flt. Sgt. M. J. Standley.

KILLED ON ACTIVE SERVICE.—Sgt. G. D. Calder; Sgt. H. T. Farrer; Sgt. J. N. Harvey; P/O. J. J. Holloman; P/O. L. W. Waters.

Royal Canadian Air Force

KILLED IN ACTION.—W/O. J. A. A. L. Bourassa; F/O. W. D. Gibson; P/O. J. P. Michael; Act. Flt. Lt. J. J. P. Sabourin.

WOUNDED OR INJURED IN ACTION.—Flt. Sgt. F. G. Hubbard.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—Sgt. W. C. Keegan; Flt. Sgt. G. H. Rowe.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. G. Le R. Ellsworth; P/O. J. D. MacLeod; P/O. M. J. O'Sullivan.

MISSING.—Flt. Sgt. C. R. Bee; Flt. Sgt. P. S. O. Brichta; Sgt. R. E. Brown; Sgt. F. E. Davidson; Sgt. G. L. Dixon; Sgt. T. A. Drew; Sgt. H. B. Einarson; Sgt. G. I. Fee; P/O. G. C. Goold; Flt. Sgt. J. E. Land; Sgt. J. B. Lawrence; Flt. Sgt. L. J. Lemoine; Sgt. F. E. E. Lyons; P/O. C. G. T. McGregor; Sgt. S. McMenoy; P/O. A. T. Persian; Sgt. W. D. Probert; P/O. C. W. Resume; Sgt. J. T. Reid; Sgt. S. B. Robson; P/O. D. W. Ross; Sgt. C. E. Stuart; Sgt. H. D. Van-Norman.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—P/O. F. W. Henderson.

KILLED ON ACTIVE SERVICE.—Sgt. A. D. Cooper; Sgt. G. M. Frame; Sgt. L. Gilbert; Flt. Sgt. J. D. Granger; Sgt. K. M. Grant; Sgt. C. W. Kelner; Sgt. W. G. Keogh; Sgt. P. C. Neuls; Sgt. J. A. M. St. Pierre; Sgt. R. E. Wells.

WOUNDED OR INJURED ON ACTIVE SERVICE.—P/O. J. D. Lewis.

Royal New Zealand Air Force

WOUNDED OR INJURED IN ACTION.—Sgt. J. J. Marshall.

MISSING, BELIEVED KILLED IN ACTION.—Flt. Sgt. T. G. Clark; P/O. I. A. Grant; P/O. J. L. Speedy.

KILLED ON ACTIVE SERVICE.—Sgt. C. G. Jones.

South African Air Force

KILLED ON ACTIVE SERVICE.—Lt. R. T. E. Morrison; Air Sgt. Reynolds.

Casualty Communiqué No. 186

Royal Air Force

KILLED IN ACTION.—P/O. R. K. Fookes.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. R. W. Barlow; Sgt. A. E. Holder; Sgt. W. A. McDonnell; Sgt. A. S. Urquhart; Sgt. G. C. Williams.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. H. E. Brown; Flt. Sgt. A. H. Brunt; P/O. T. McE. Dando; Sgt. A. C. Dick; Sgt. E. G. T. Hall; Act. Sqn. Ldr. G. L. B. Harris; Sgt. R. C. Hawkes; Sgt. N. Leaver; Flt. Lt. A. B. Parker; Sgt. J. S. Pinsent; Sgt. J. R. Strathdee.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. W. T. Belton; Sgt. G. E. Charlesworth; Sgt. H. W. Crock; Sgt. K. D. Downing; Sgt. R. H. Fuller; Sgt. E. A. Hall; Sgt. G. A. Hill; Sgt. F. H. Huntley; Sgt. J. L. M. Illingworth; Sgt. R. A. Low; Sgt. R. W. Michelin; Sgt. J. F. Oakley; Sgt. P. Sandison; Sgt. K. J. Smith; Sgt. K. Yates.

MISSING.—P/O. F. J. Adams; Sgt. J. C. Allan; Sgt. A. Arnot; Sgt. A. R. Ashford; Sgt. J. E. Bailey; Sgt. P. P. Bannerman; Act. Sqn. Ldr. D. B. Barnard; Sqn. Ldr. H. W. Barnard; Sgt. G. N. Barnes; Sgt. R. G. Bassett; Sgt. J. Beattie; Sgt. A. F. Bentley; Sgt. J. Berry; Sgt. E. D. Booty; Sgt. K. A. Bouffler; Flt. Sgt. A. G. T. Bradley; Sgt. W. A. F. Brannon; P/O. D. F. Bratchell; Sgt. H. M. R. Broadhead; Flt. Sgt. A. B. Brooks, D.F.M.; Sgt. L. B. Brown; Sgt. T. B. Brown; Sgt. E. W. Catlin; Sgt. J. Cliffe; Sgt. M. A. Collins; Sgt. J. Collumbell; Sgt. E. C. Confait; P/O. B. B. Cooper; Sgt. O. R. O'H. Cotter; Flt. Lt. A. C. Culver, D.F.M.; Sgt. W. H. R. Day; P/O. J. S. Dicker; P/O. S. W. Dodge; Sgt. C. Drury; Sgt. J. L. Dyhouse; P/O. J. B. Edwards; P/O. F. H. Ellis; Sgt. D. H. Evans; Sgt. P. H. Fairbanks; Sgt. R. Finklestone-Sayliss; Sgt. R. Forster; P/O. E. Gatis; Sgt. A. H. G. Genny; Sgt. R. G. Goldsworthy; P/O. N. J. Graves-Smith; Sgt. D. J. Green; Sgt. T. M. Grice; Sgt. J. H. Hadwen; Sgt. J. E. W. Hale; Sgt. J. Hall; Sgt. F. Hamer; Sgt. R. A. Haskins; P/O. L. B. Haward; Act. Sgt. R. A. Heathcote; P/O. C. C. Hendley-Cross; Sgt. A. E. Hiscock; Flt. Sgt. F. Hobson; P/O. M. V. Hodge; Sgt. J. Holland; Sgt. L. Horn; Sgt. W. Hunt; Sgt. J. A. Hunter; Sgt. A. W. Jones; Sgt. R. A. Kelly; Sgt. E. A. J. King; Sgt. M. J. Kynaston; Sgt. J. R. Locke; Sgt. P. McIntyre; Sgt. D. C. Marsh; Sgt. S. V. Miles; P/O. J. D. Moffatt; P/O. D. B. Moody; Sgt. R. S. Morton; P/O. L. J. Musselwhite; Sgt. C. A. Newman; Sgt. D. Northey; P/O. R. D. Owen; Sgt. H. Pateman; Sgt. C. Pattison. Sgt. R. Payne; P/O. A. H. Pontius; Sgt. A. C. Ranlt; Sgt. G. D. Rawbone; Sgt. A. V. Rimes; Sgt. J. Rimmer; Sgt. H. C. Roake; Sgt. S. O. Rogers; Sgt. R. A. Russell; Sgt. J. S. Sagar; Flt. Sgt. W. Shankland; Sgt. D. T. Simpson; Sgt. I. J. Sims; P/O. J. T. Slater; Flt. Sgt. D. B. Smith; Act. Sgt. F. C. Smith; Sgt. J. H. Southwell; Sgt. K. R. Stansfield; Sgt. D. Steadman; Sgt. J. R. Stott; P/O. M. R. Symonds; Sgt. A. Taylor; F/O. O. D. Thomas; Sgt. L. Thompson; Sgt. A. Towndrow; Sgt. W. Walker; Flt. Sgt. J. D. Walls; Sgt. F. Walters; Sgt. J. A. Waterman; Sgt. N. Whitfield; P/O. C. J. Whittingham; Sgt. D. Williams; Sgt. H. M. Williams; Sgt. R. J. Wilson; Sgt. T. C. Woodhouse; Sgt. E. Wright; Sgt. W. E. B. Wright; Sgt. A. K. Wrigley; Sgt. A. Young.

KILLED ON ACTIVE SERVICE.—L.A/C. H. M. Bolt; L.A/C. J. Burke; Sgt. L. H. Jones; Act. F/O. J. Methan; Flt. Sgt. J. F. Mulroy; Sgt. G. L. Parish; L.A/C. W. T. G. Pridmore; L.A/C. H. Threadgold.

WOUNDED OR INJURED ON ACTIVE SERVICE.—L.A/C. P. L. Marshall; L.A/C. F. Taylor.

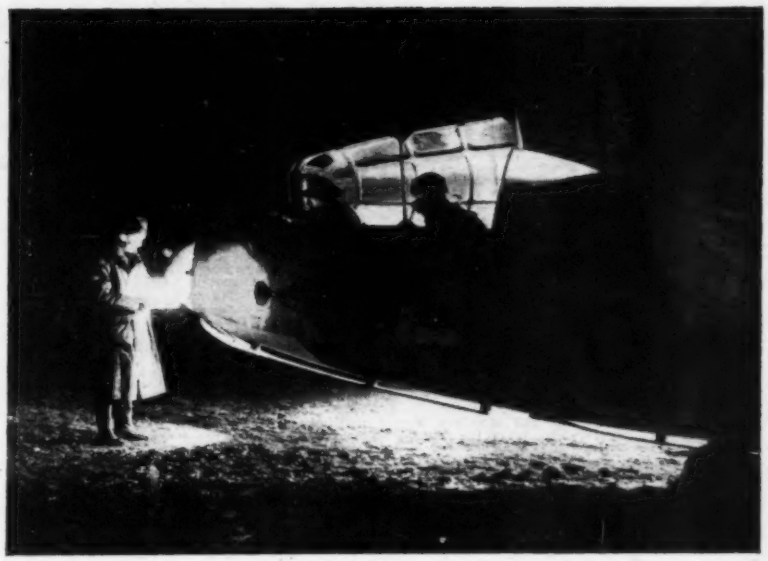
—PREVIOUSLY REPORTED WOUNDED OR INJURED IN ACTION, NOW REPORTED WOUNDED OR INJURED ON ACTIVE SERVICE.—Sgt. W. B. Goode.

DIED ON ACTIVE SERVICE.—A/C.2 G. Malin.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. B. A. Willis.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. R. H. C. Clark; Sgt. E. J. Gray; P/O. R. W. Smith.



NIGHT MANŒUVRES UP-TO-DATE: Glider pilots and airborne troops practise night landings on Hotspur gliders.

MISSING, BELIEVED KILLED IN ACTION.—Sgt. D. Hill; Sgt. L. W. Thomas.

MISSING.—Sgt. D. R. Gilchrist; Sgt. H. M. Hawkins; Sgt. W. J. Hoban; Sgt. R. D. Macdonald; Sgt. H. R. McGowan; Sgt. W. MacPhee; Sgt. C. M. Thorn.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Sgt. B. Phillips.

Royal Canadian Air Force

KILLED IN ACTION.—Sgt. J. W. Drinkwater; Sgt. A. F. C. Ratcliffe.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. W. M. Richards.

MISSING, BELIEVED KILLED IN ACTION.—P/O. R. J. Cartmell; P/O. R. E. Clarke; Sgt. W. S. Grant; Sgt. C. A. Kitson; Sgt. W. F. Murray; Sgt. H. E. Orr; Sgt C. A. Paton; Sgt. J. G. Spouler; Flt. Sgt. J. G. St. Louis; Sgt. A. C Yates.

MISSING.—Sgt. P. F. Brawley; Sgt. M. E. Buechler; P/O. H. H. Burton; Sgt. G. M. Caldwell; Sgt. A. B. Cameron; Sgt. A. L. Caron; Flt. Sgt. R. B. Clements; Sgt. R. T. J. Collett; Sgt. B. A. W. Coutts; Sgt. H. S. Cowley; Sgt. M. R. Crocker; P/O. E. A. F. De Bartok; P/O. C. R. Foskett; Sgt. R. D. Gibson; Flt. Sgt. J. A. Gordon; Flt. Sgt. C. W. Hall; Sgt. W. H. Johnson; Sgt. R. A. Kertson; Sgt. J. N. S. King; Sgt. B. L. Kohn; Sgt. R. Q. Leatherman; Sgt. E. S. J. McCasky; Flt. Sgt. J. C. Macdonald; Sgt. W. B. Martin; P/O. C. R. F. Morris; Sgt. J. E. Olmsted; Sgt. D. L. Pablo; Sgt. E. R. Paudasher; Sgt. C. E. Pollard; Sgt. W. H. Rider; Sgt. A. C. S. Robertson; Sgt. J. E. Rodgers; Sgt. J. A. Royle; Sgt. J. A. Sampson; Sgt. W. O. Snow; Sgt. C. R. Sullivan; Flt. Sgt. H. J. Thurston; Flt. Sgt. S. A. Turner; Flt. Sgt. R. O. Warren; P/O. J. E. Wilkes.

KILLED ON ACTIVE SERVICE.—Flt. Sgt. J. A. Clark; Sgt. E. M. Harney; P/O. J. A. Hay; L.A/C. W. R. A. Jahnke; Sgt. R. A. Kinnee; L.A/C. E. D. Lawley; A/C.1 L. O. Luten; Sgt. W. H. Pickering; Cpl. G. W. Wilson.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—Sgt. R. Greene; Sgt. R. C. Hughes.

Royal New Zealand Air Force

MISSING, BELIEVED KILLED IN ACTION.—Sgt. R. H. Crabtree; P/O. R. Dallenger; Sgt. H. O. Goddard; P/O. G. C. R. Goodwin; P/O. W. A. Hoskins; Flt. Sgt. D. T. Lamb.

MISSING.—Sgt. W. J. Anderson; Sgt. L. E. Bell; P/O. R. E. Glensor; W/O. A. W. Osman.

KILLED ON ACTIVE SERVICE.—F/O. J. W. Purcivall, D.F.C.

South African Air Force

KILLED ON ACTIVE SERVICE.—Air Sgt. Jacobs; J. Van Voureen; Lt. B. J. Wise.